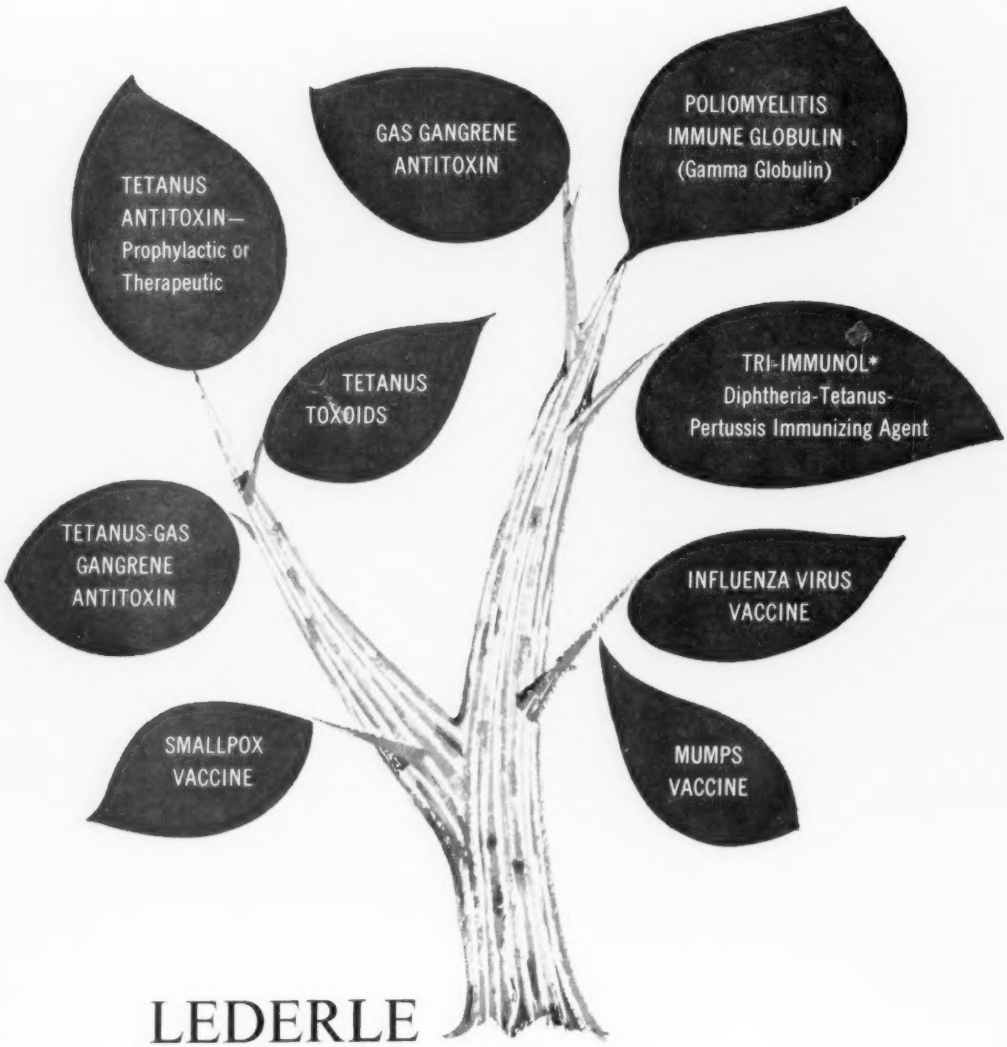
INDUSTRIAL MEDICINE AND SURGERY

Volume 25 DECEMBER 1956 Number 12



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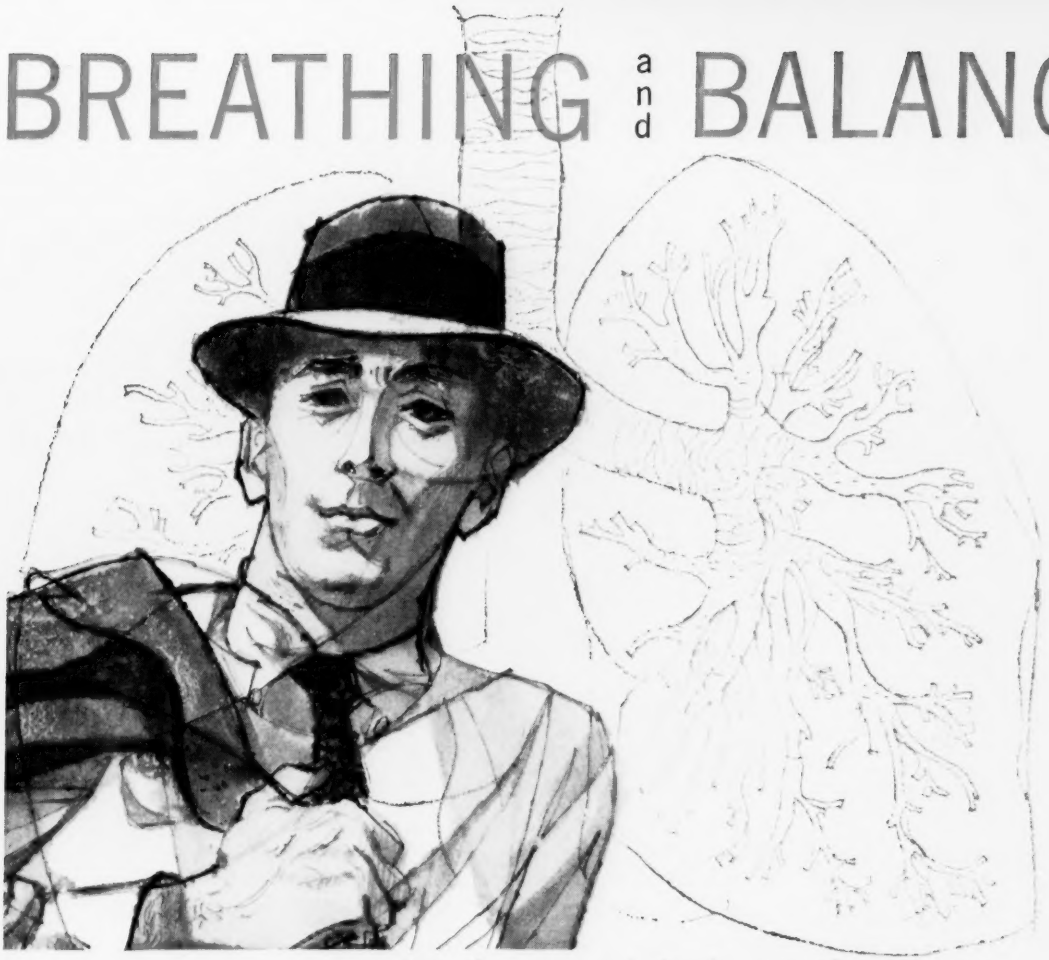

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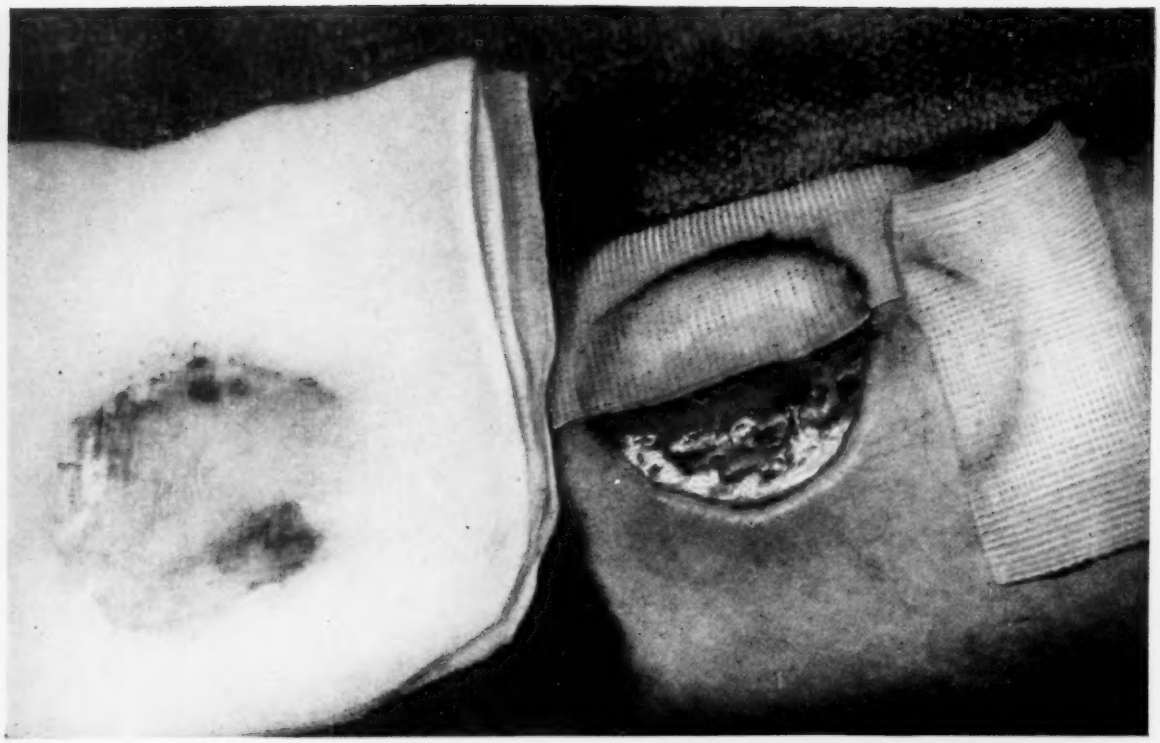

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PETER H. NASH, M.D., has been appointed Regional Medical Director, Eastern Region, Bell Telephone Company of Canada. DR. NASH was born in England, 1917; interned at Middlesex Hospital; and served four years in the Royal Army Medical Corps, with service in United Kingdom, France, Holland, Belgium, and Germany. He was awarded the Rockefeller Fellowship in Industrial Medicine, 1947, and carried out research work at Harvard Medical School on beryllium in industry. At Slough Industrial Health Service, England, he developed the health services and industrial hygiene aspects, providing service for 16,000 employees in 160 plants. He set up the occupational hygiene unit at London School of Hygiene and Tropical Medicine, and was part-time lecturer in industrial health. DR. NASH came to Canada in 1953, worked with Ontario Division of Industrial Hygiene, and set up and administered an industrial health service for small plants in Kitchener, Ontario. He joined the Medical Staff of Bell Telephone in 1954.

JONES T. WRIGHT, M.D., has joined the Medical Staff, Lockheed Aircraft Corporation, Georgia Division, Marietta, Georgia. DR. WRIGHT graduated from Medical College, University of Georgia, 1950, and completed residency in internal medicine at Georgia Baptist Hospital, Atlanta. He served four and a half years with the U.S. Army and was in general practice in Donaldsonville, Georgia. He is a member of American Medical Association, Georgia Medical Society, Second District Medical Society, and Decatur Seminole Medical Society.

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1. Babcock, M. J., et al: Milbank Mem. Fund Quart.: 32:323 (Oct.) 1954. 2. McLester, J. S. and Darby, W. J.: Nutrition and diet in health and disease. W. B. Saunders and Company, Philadelphia, 1952, p. 584. 3. Pollack, H. and Halpern, S. L.: Therapeutic Nutrition, National Research Council, publication 234, 1952, p. 37.

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JOHN C. DUFFY, M.D., has been appointed Coordinator of Plant and Laboratory Medical Services for the headquarters plant of International Business Machines in New York City. He received his B.A. and M.D. degrees from Stanford University and a Doctorate of Industrial Medicine Degree from the University of Cincinnati. He is a member of the Industrial Medical Association; New York State Medical Society; American Medical Association; American Academy of Occupational Medicine; American Industrial Hygiene Association; the Cardiac in Industry Committee of the New York Heart Assembly; Executive Committee, Broome County Health Association; and Committee for In-plant Training of Physicians of the Industrial Medical Association. DR. DUFFY joined IBM in June, 1953, as Endicott Plant Physician.

ALICE HAMILTON, M.D., 87, of Hadlyme, Connecticut, a pioneer in industrial medicine in the United States, was named "Medical Woman of the Year" by the Boston Chapter of the American Medical Women's Association. She was awarded the citation for "excellence in the field of medicine and for her shining example on how to grow old gracefully." DR. HAMILTON directed the first comprehensive survey of occupational diseases in 1920. She was a leader in bringing the need for legislation to protect workers before state and national governments.

O. T. MALLERY, JR., M.D., has been appointed to the newly-created position of Medical Director for Employers Mutuals of Wausau. He will assume his new duties on February 1, 1957, and will be chiefly concerned with

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broadening the company's services to policyholders. DR. MALLERY has been on the medical faculty of the University of Michigan since 1941 and since 1951 has served as the Director of the University's Institute of Industrial Health. He is a graduate of Phillips Exeter Academy, Yale University and the University of Pennsylvania, where he received his M.D. degree in 1939.

A. F. LECKLIDER, M.D., Medical Director, Fisher Body Division of General Motors Corporation, retired November 30, 1956, after 35 years of service. A graduate of the College of Medicine, University of Illinois, 1914, DR. LECKLIDER served as a medical officer in France in 1917-18. He became the Medical Director of the Cleveland Plant of Fisher Body in 1922 and was placed in charge of the medical activities of the entire Fisher Body Division in 1929. During the early years of his association with the automobile industry his concern with the health and occupational problems of employees arose from his knowledge of the hazardous machinery used in forming the tremendous amount of wooden parts then used in body construction, and the lead contained in the paints of that day. During the intervening years he has seen the methods of body manufacture change radically, with steel displacing wood to create a different accident hazard, and lead-free lacquers largely replacing paint. The uses of various metals, solvents and synthetic materials have given rise to many new problems, each of which, however, has proved controllable. Some 30 plants and 80,000 employees have contributed to the doctor's industrial experience.

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THEODORE E. ALLEN, M.D., has been appointed Associate Medical Director of Socony Mobil Oil Company. GEORGE M. SAUNDERS, M.D., is Medical Director. DR. ALLEN was formerly Associate Medical Director for the Arabian American Oil Company. He is a graduate of Williams College and the Yale University School of Medicine, and is a diplomate of the American Board of Preventive Medicine. He has done graduate medical training at the U. S. Army Medical School (School of Tropical and Military Medicine), and at Harvard University (Internal Medicine and School of Public Health). His studies at Harvard's School of Public Health were done under a Rockefeller Foundation Fellowship. DR. ALLEN served as a medical officer in the Air Force during World War II and was discharged with the rank of Major. He was elected to Delta Omega, honorary public health society, in 1948.

JOHN L. NORRIS, M.D., Medical Director, Kodak Park Works, Eastman Kodak Company, Rochester, received a Citation of Merit for his outstanding work and pioneering efforts in recognizing and treating the alcoholic as a sick individual. It was presented by C. NELSON DAVIS, M.D., Medical Director, on behalf of the Malvern Institute for Alcoholic Studies, at a meeting in September when the Industrial Medical Association of Delaware Valley was the guest of the Institute. The Citation has been approved only once before, when GEORGE H. GEHRMANN, M.D., was honored for his work in establishing an alcoholic program for the Du Pont Company. About 60 members of the Delaware Valley IMA attended the session.

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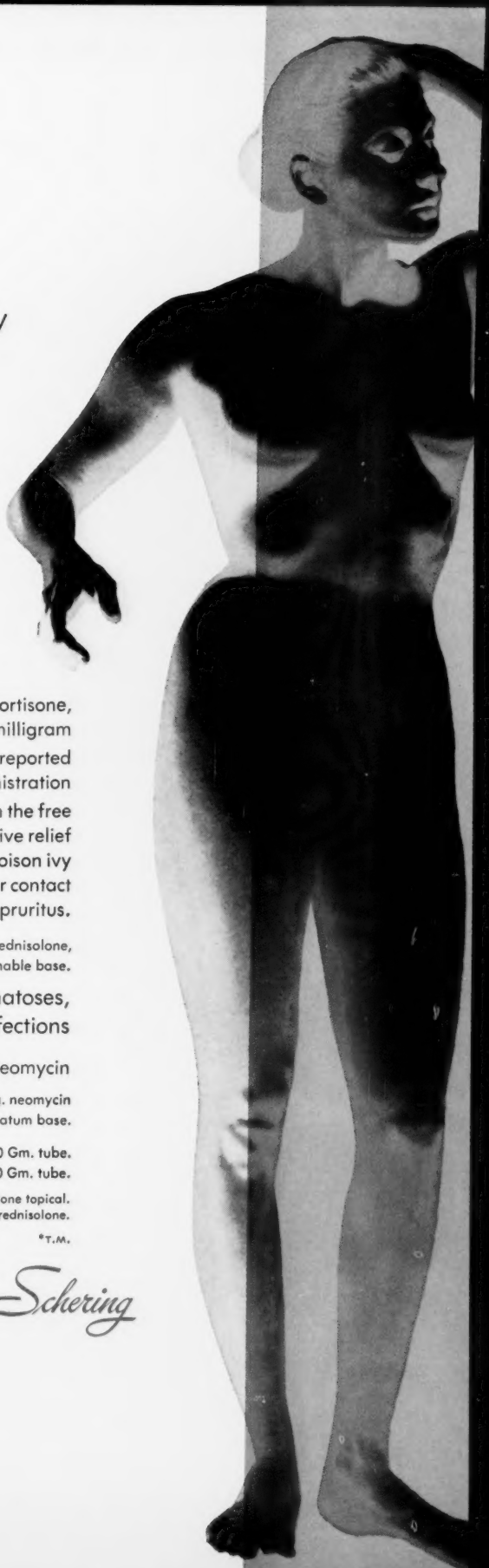

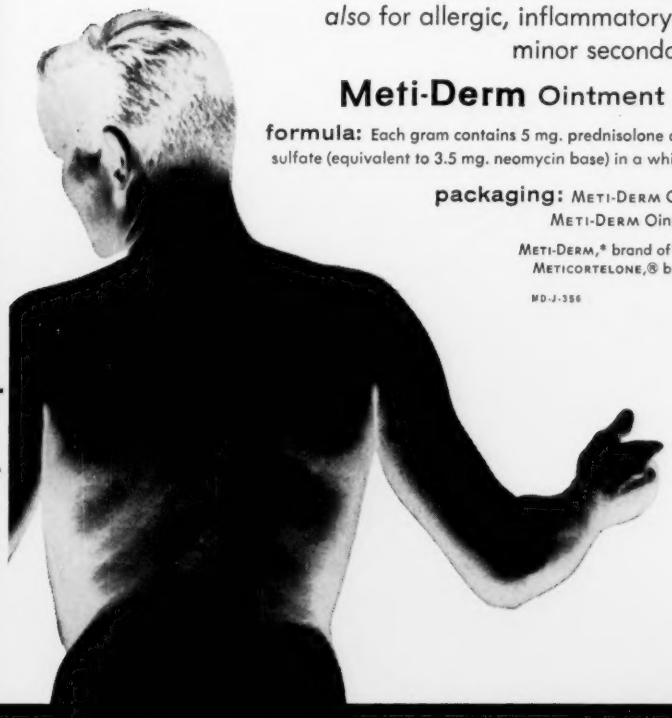

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Vice-President, Charles Pfizer & Co., Inc., Brooklyn, New York.

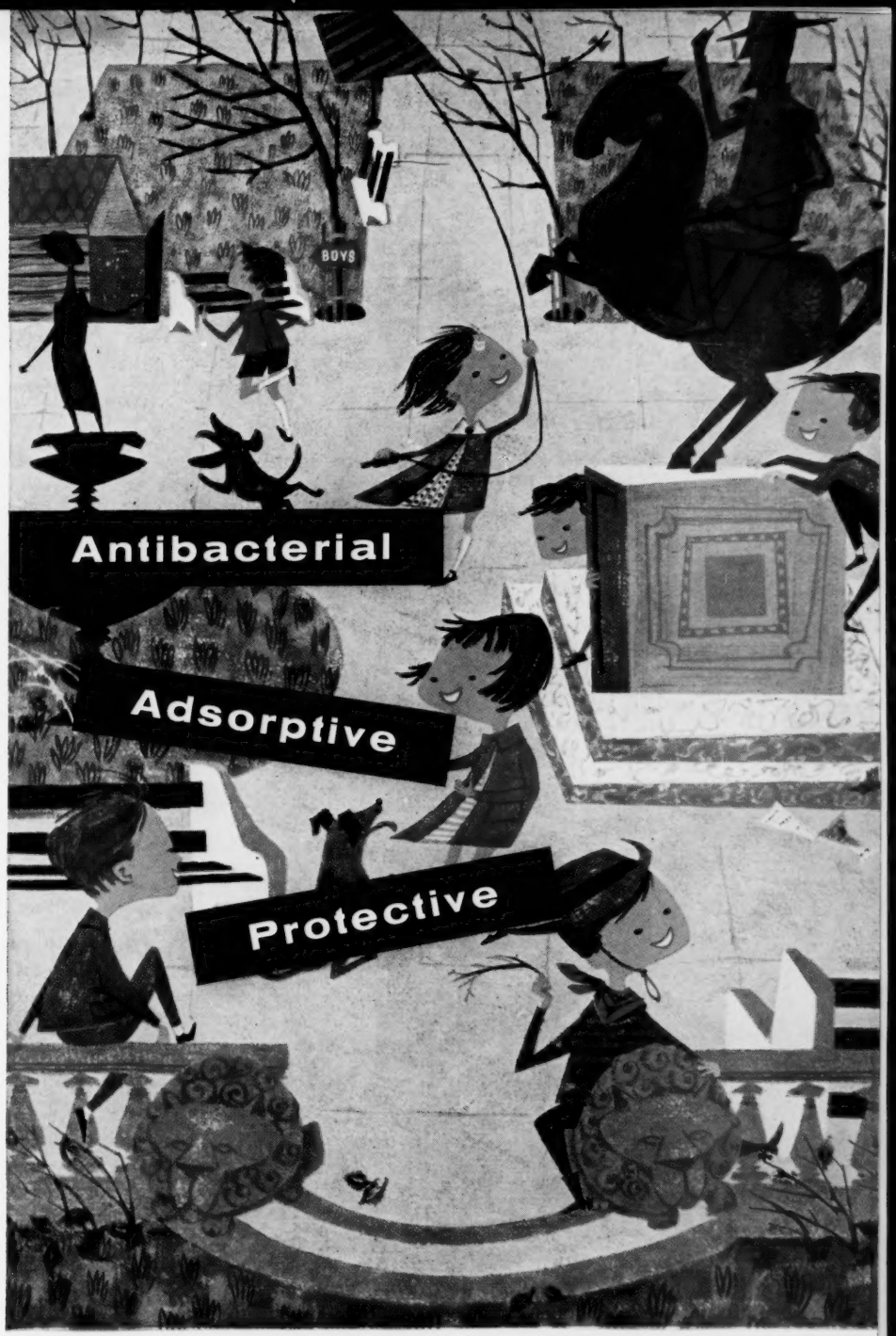
HAYDEE J. DE YOUNG, M.D., Medical Director, Medical Surgical Center, State Insurance Fund, Commonwealth of Puerto Rico, has returned to San Juan after representing the Industrial Medical Association at the Third Austrian Congress on Industrial Medicine at Vienna, October 1-4, 1956. DR. DE YOUNG'S report of this meeting will appear in an early issue of *Industrial Medicine and Surgery*. DR. DE YOUNG graduated from the Woman's Medical College of Philadelphia in 1951, interned at the College hospital, then became Medical Director at the Las Piedras Health Center in 1953. From there she transferred to the State Insurance Fund where she has been Medical Director since July, 1955.

AMERICAN ACADEMY OF OCCUPATIONAL MEDICINE Board of Directors held a meeting on October 10, 1956, in New York City. The Program Committee presented detailed plans for the next Annual Meeting of the Academy, which is to be held at the Shoreham Hotel, Washington, D.C., February 13-15, 1957. R. LOMAX WELLS, M.D., is in charge of arrangements, and will be assisted by LLOYD SHONE, M.D., JOHN LYNCH, M.D., and LAMSON BLANEY, M.D. The following physicians were elected to membership in the Academy: CHARLES WADE ASBURY, M.D., Medical Services Manager, The Champion Paper and Fibre Company, Hamilton, Ohio; ROLF G. BAGINSKY, M.D., Plant Physician, E. I. du Pont de Nemours and Company, Martinsville, Virginia; DALLAS EWING BILLMAN, M.D., Medical Staff, Corning Glass Company, Corning, New York; ALBERT SIDNEY JOHNSTON CLARKE, M.D., Chief Physician, Phillips Petroleum Company, Kansas City, Kansas; HELEN S. COMPTON, M.D., Physician, Cincinnati and Suburban Bell Telephone Company, Cincinnati; ALVIN DAVIS, M.D., Fellow in Industrial Medicine, Kettering Laboratory, University of Cincinnati; LAWRENCE AUGUSTUS PYLE, JR., M.D., Assistant Medical Director, Chesapeake and Potomac Telephone Company, Washington, D.C.; EDWARD J. TRACY, M.D., Surgeon of Air Material Command, Wright-Patterson Air Force Base, Ohio; ARTHUR JOHN VORWALD, M.D., Chairman and Professor, Department of Industrial Medicine and Hygiene, Wayne University College of Medicine, Detroit; and RAFAEL B. PENALVER, M.D., Havana, Cuba, was elected as the First Corresponding Member of the Academy. At the same meeting, CAREY P. MCCORD, M.D., was elected to Honorary Membership. This honor was conferred in recognition of his many important contributions to the field of industrial health. As an Honorary Member, DR. MCCORD is entitled to all privileges of the Academy except voting and holding office.

THE "MEDICINE IN INDUSTRY" session at the National Safety Congress in Chicago, October 25, was attended by a capacity audience of physicians, nurses, hygienists, safety engineers, and others interested in occupational health. B. DIXON HOLLAND, M.D., Secretary, A.M.A. Council on Industrial Health, was Chairman, and CLARK D. BRIDGES, A.M.A. Council on Industrial Health, was Co-Chairman. Papers presented were: "The Injured Back in Industry" by J. HUBER WAGNER, M.D., Chief Surgeon, United States Steel Corporation, Pittsburg; "Vision in Industry" by E. B. SPAETH, Chairman, A.M.A. Committee on Estimation of Loss of Visual Efficiency, Philadelphia; and "Physical Examinations of Industrial Workers—Are They Getting Results?" by OTTO TOD MALLERY, JR., M.D., Director, Institute of Industrial Health, University of Michigan; LOGAN T. ROBERTSON, Medical Director, Occupational Health Services, Asheville, North Carolina; and CHARLES E. THOMPSON, M.D., Health Research Center, Chicago.

NORTHWEST ASSOCIATION OF OCCUPATIONAL MEDICINE held its First Annual Session in Portland, Oregon, September 9, 1956. Medical, legal, and insurance problems involved in providing for growing population of indus-

In diarrhea
consider
these
clinical
constants...



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1. Russ, J.D.: Personal communication.

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trial workers was examined in the meeting which was open to physicians, nurses in industry, attorneys, safety engineers, and others concerned with the welfare of workers in industry.

THE BELL SYSTEM Medical Directors Conference was held at the Hershey Hotel, Hershey, Pennsylvania, October 22-25, 1956. This meeting was attended by 43 Medical Directors and Advisers from all parts of the United States and Canada. Reports of the working committees who have had under study during the past year assigned projects of interest to the group were presented as follows: "Revision of Standards for Preplacement Examinations" by R. LOMAX WELLS, M.D., Chesapeake and Potomac Companies; "Functions and Responsibilities of Bell System Medical Directors and Medical Advisors" by CHARLES E. MARTIN, M.D., Bell Laboratories; "Survey of Industrial Back Conditions in the Bell System, 1952-1954" by GEORGE F. WILKINS, M.D., New England Company; "Sickness Absence and Practice of Occupational Medicine" by NORMAN PLUMMER, M.D., New York Company; "The Subjective Evaluation of an Influenza Vaccination Program" by LAWRENCE A. PYLE, JR., M.D., Chesapeake and Potomac Companies; "Personnel Research Objectives in the Bell System" by MR. ROBERT K. GREENLEAF, Director of Personnel Research for the American Telephone and Telegraph Company. The following day featured a discussion of "Effective Utilization of Nurses in Industry" by DONALD C. BEWS, M.D., Bell of Canada, whose company has developed numerous fields of activity for nurses in order to enhance their opportunities for contribution to constructive programs of health maintenance. The balance of the second day was devoted to the subject "Communications and Environmental Relations in Occupational Medicine," a discussion for which HAROLD I. MEYER, M.D., Illinois Bell, served as moderator. The subject was opened with a report by WILLIAM JEND, JR., M.D., Michigan Bell, on an employee survey about the Medical Department in his Company. JEROME W. SHILLING, M.D., Pacific Company, reviewed a program initiated in that Company for improving relationships with practicing physicians and with physicians appointed as medical consultant to the Company. The various areas and opportunities for improved relations were reviewed in some detail in small group discussions and reports from each of the small groups were subsequently made available to the entire conference. HENRY S. BROWN, M.D., retired Medical Director of Michigan Bell Telephone Company, submitted an analysis of the various Bell System Companies with reference to the preservation and/or disposal of medical records and x-rays. CLYDE C. GREENE, JR., M.D., Pacific Company, presented the details of a revised First Aid program as adopted by his Company. Other subjects discussed were as follows: "The Menninger Seminar on Industrial Psychiatry, Topeka, Kansas—March, 1956" by DR. PYLE and DOROTHEA LEMCKE, M.D., Long Lines Department, American Telephone and Telegraph; "Periodic Health Appraisals at Bell Telephone Laboratories" by MARSHALL J. HANLEY, M.D., Bell Laboratories; "Health Test Program" by GEORGE BISGEIER, M.D., New Jersey Company; "Retirement and Mortality Experience in the Bell System" by MR. T. T. STEVENSON of the Comptroller's Department, American Telephone and Telegraph; "Coronary Heart Disease"—a discussion with NORMAN PLUMMER, M.D., New York Company, as moderator and HUGH LACKEY, M.D., Dean, Cornell University Medical College, as guest speaker. The final day of the conference was utilized for informal general discussion of subjects of current interest to the physicians of the Bell System and was concluded with recommendations and plans for the 1957 Conference.

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Bibliography of approximately 300 Xylocaine references upon request.

*Southworth, J. L., and Dabbs, C. H.: Xylocaine: a superior agent for conduction anesthesia, Anesth. & Analg. *32*:159 (May-June) 1953.

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Each 4½ fl. oz. unit contains, per 100 cc., 16 mg. sodium biphosphate and 6 gm. sodium phosphate.

(1) Swinton, N. W., Surg. Clin. of No. Am. 35:833, 1955
(2) Gross, J. M., Jl. Int. Coll. Surg. 23:24, 1955

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Medihaler-Nitro is 1% octyl nitrite in nebulization form. Outstanding for the emergency relief of acute anginal pain. Each inhalation delivers precisely 0.25 mg. of octyl nitrite. By using the lungs as the most direct portal of entry, faster relief than from orally administered drugs is assured because of proximity of pulmonary and coronary circulations. Faster-acting than nitroglycerin. Fewer side effects than from nitroglycerin or amyl nitrite.

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"The need for a therapeutic agent that would provide prolonged relaxation of spastic or rigid muscles is generally recognized. To date, there has been no available drug proved sufficiently safe, effective, or long-lasting to justify its general use."[1]

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supplied: 250 mg. yellow, scored tablets, bottles of 50.

(1) Abrahamsen, E. H., and Baird, H. W., III: J.A.M.A. 160:749 (Mar. 3) 1956.

(2) Amols, W.: J.A.M.A. 160:742 (Mar. 3) 1956.

(3) Rodriguez-Gomez, M.; Valdes-Rodriguez, A., and Drew, A. L.: J.A.M.A. 160:752 (Mar. 3) 1956.

(4) Smith, R. T.; Kron, K. M.; Peak, W. P., and Hermann, I. F.: J.A.M.A. 160:745 (Mar. 3) 1956.

*T.M. †U. S. Patent Pending

FLEXIN is sufficiently safe

"No significant alterations of pulse, blood pressure, or respiration were observed [during therapy with FLEXIN], and there were no deleterious effects noted in blood counts, urinalyses, or liver and kidney function tests."[2]

"...no important signs of toxicity were found in blood or urine studies...drowsiness and transient dizziness in an occasional patient, together with occasional mild gastric irritation, were the only undesirable side-effects observed..."[3]

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"When it [FLEXIN] was administered orally in doses of 250 to 500 mg. three and four times a day, 14 of 18 patients with spasticity due to spinal cord lesions showed objective improvement of spasticity."[3]

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"The administration of an effective dose of zoxazolamine [FLEXIN] was usually followed by muscular relaxation within an hour, with the peak effect being reached within two hours and waning within four hours. Some degree of muscular relaxation was occasionally seen 24 hours or longer after discontinuance of therapy."[1]

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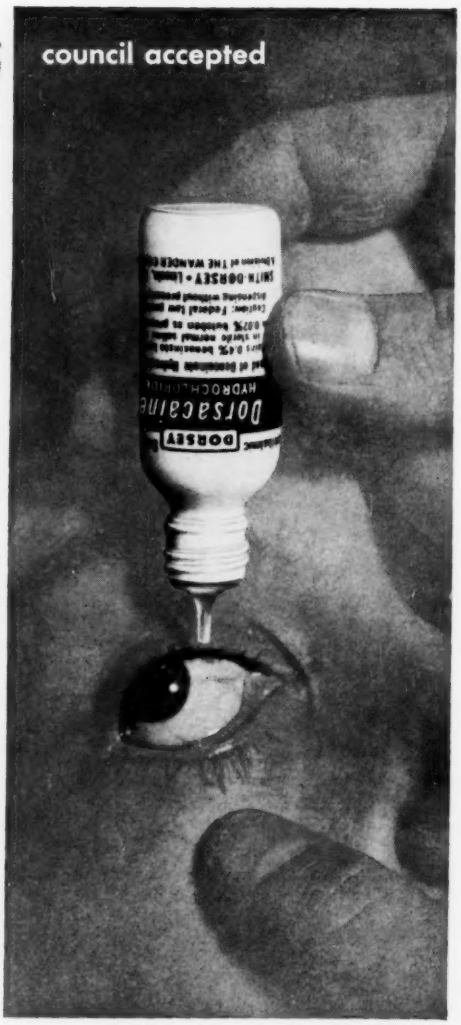

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rapid action and

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no cases reported of dermatitis occurring in patient's eye or on hands of physician.

relatively **nonirritating**
does not sting or burn when dropped into the eye—changes in the corneal epithelium or hyperemia of the conjunctiva rarely occur.

Average dose: *for tonometry,* 2 drops. *For minor surgical procedures,* 2 drops instilled 3 times at 90 second intervals.

Supplied: sterile normal saline solution with 0.02% Butoben as preservative, and containing 0.4% Dorsacaine Hydrochloride (benoxinate hydrochloride). In ½ oz. plastic squeeze bottle with dropper tip which delivers uniform drops (approximately 45 drops per cc.).

*Schlegel, H. E., Jr., and Swan, K. C.: A. M. A. Arch. Ophth. *51*:663 (May) 1954.

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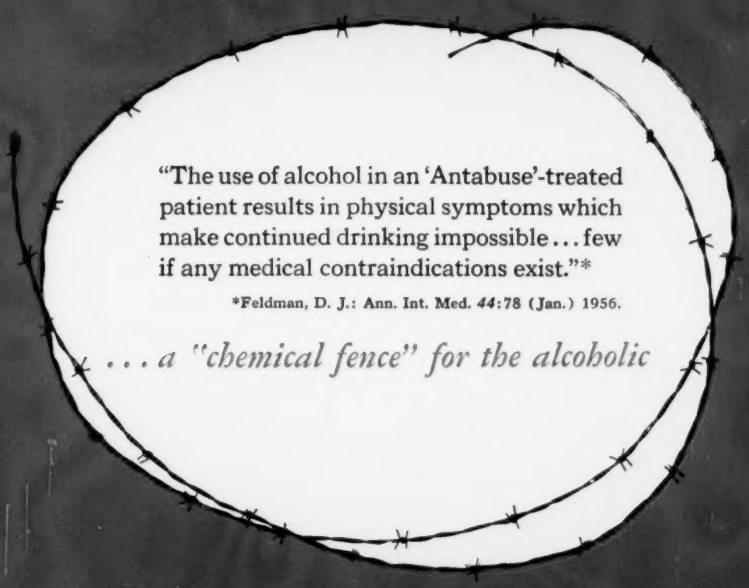

"The use of alcohol in an 'Antabuse'-treated patient results in physical symptoms which make continued drinking impossible... few if any medical contraindications exist."*

*Feldman, D. J.: Ann. Int. Med. *44*:78 (Jan.) 1956.

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A brochure giving full details of therapy will be sent to physicians upon request.

"ANTABUSE" is supplied in 0.5 Gm. tablets (scored), bottles of 50 and 1,000.

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ATARAXOID is a unique, new combination of STERANE and ATARAX, which now permits simultaneous symptomatic control and reduction of attendant anxiety and apprehension in rheumatoid arthritis and other indications.

The added tranquilizer control, desirably easing mental stress, also directly assists clinical progress. It minimizes the chance of exacerbation related to emotional strain and facilitates patient confidence and cooperation in the therapeutic program toward maximum rehabilitation.

ATARAXOID exerts the anti-rheumatic, anti-inflammatory activity of STERANE distinctly superior to previous steroids, effective in radically reduced dosage, and with minimal disturbance of electrolyte and fluid metabolism.

The ataractic effect is a central neuro-relaxing action – the result of a marked cerebral specificity – free of mental fogging and devoid of any major complications: no liver, blood or brain damage. This peace-of-mind component is also used in the lowest dosage range.

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In Rheumatoid Arthritis, other collagen diseases, bronchial asthma and inflammatory dermatoses

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[1] MACON, WILLIAM L., JR., M.D.: Citrus Bioflavonoids in the Treatment of the Common Cold. *Indus. Med. & Surg.*, 25:525, 1956.

Each capsule contains:
Lemon-Orange Flavonate Glycoside (100 mg.)
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Recommended Dosage:
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especially in severe, persistent colds
unsurpassed symptomatic relief simultaneously with antibacterial protection...to ward off common complications such as bronchitis and laryngitis...to help shorten recovery period.

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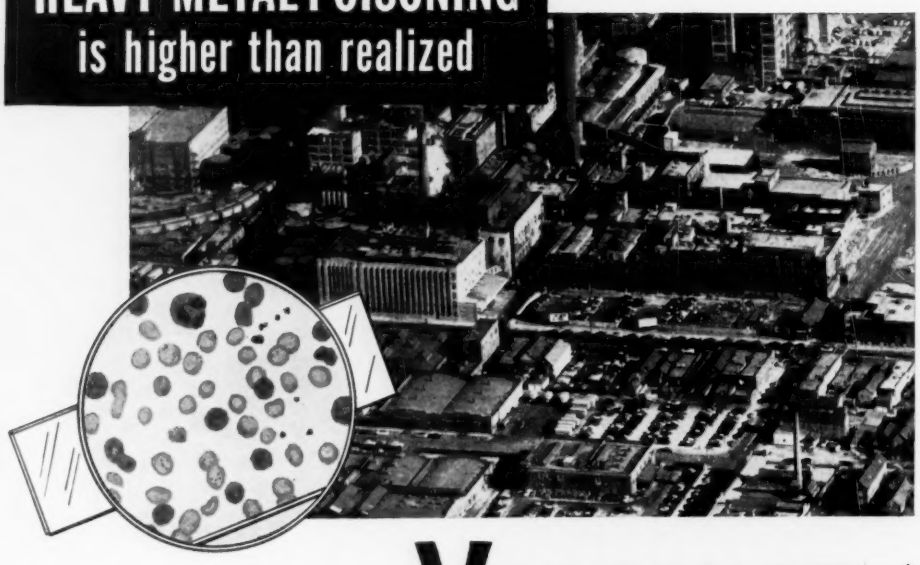

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Write for descriptive booklet.

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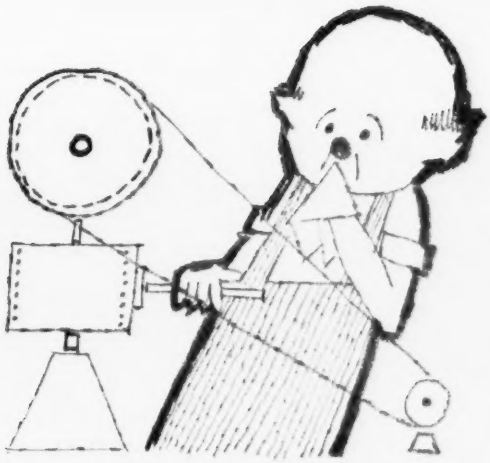

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Wintertime's increased incidence of colds can cut sharply into production schedules and efficiency ratings.

But now . . . for just a fraction of the cost of lost man-hours . . . you can reduce lost-time due to cold symptoms with this new CORYBAN "anti-cold" program.

CORYBAN combines an effective, low-side-effect antihistamine with APC, vitamin C and new, purified hesperidin (to strengthen the capillary wall). This CORYBAN combination provides quick, effective relief of cold symptoms and helps guard against re-invasion. To begin a CORYBAN "anti-cold" program in your plant, contact your usual source of supply, or write:

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Each CORYBAN *capsule contains:*

Purified Hesperidin	20 mg.
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Dosage: As directed on package.
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ROERIG Rx *Chicago 11, Illinois*

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Dad's cough, occurring with colds, is rapidly relieved when BENYLIN EXPECTORANT's comprehensive action soothes "rawness" and irritation, thins tenacious mucus, and combats bronchospasm.

Mom's cough – complicated by allergic symptoms – responds equally well, for BENYLIN EXPECTORANT contains the potent antihistaminic-antispasmodic, Benadryl,® to ensure added relief of nasal congestion, sneezing, and lacrimation.

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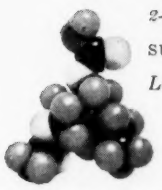

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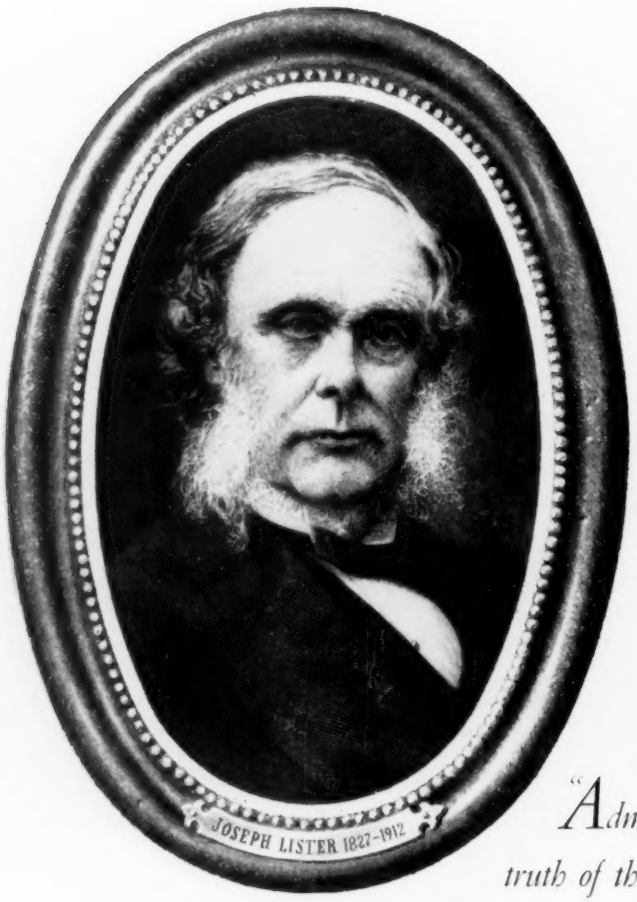

"Admitting then, the truth of the germ theory, and proceeding in accordance with it, we must, when dealing with any case, destroy in the first instance once for all any septic organisms which may exist within the part concerned; and after this has been done, our efforts must be directed to the ***prevention of the entrance of others into it."***

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THE WORDS OPPOSITE were read by Joseph Lister before the British Medical Association in Dublin, August 9, 1867. Though they were received with lingering skepticism by many, they initiated the era of antiseptic surgery from which has evolved the concept of aseptic surgery as practiced today.

Lister's abiding concern with "the greatness of the evil of putrefaction in surgery" led him to experiment with first one technique of surgical antisepsis then another over a period of forty years. These techniques involved mainly the use of carbolic acid, applied by spray, or by packs and compresses of lint and other materials, and frequently topped with sheets of tin, lead, and ultimately oiled silk—all for the purpose of "keeping the outside world out" of the open wound.

That he succeeded in reducing surgical infection to an amazing degree—despite his primitive materials and facilities—is history.

Today we're likely to think that modern aseptic techniques and chemotherapeutic agents have largely eliminated the problem of "keeping the outside world out" of wounds. Yet daily we hear more about hospital cross infection and bacterial resistance to antibacterial agents. Recently, in discussing the overall problem of hospital infection, Robertson *et al.* (Am. J. Surg., Aug., 1956) said, "We have been investigating the use of some occlusive and some antiseptic dressings and believe that we have much to learn from the writings of Lord Lister seventy-five years ago."

Which brings us to recall the truism "There's nothing really new under the sun"—including Aeroplast. Lister long ago thought of, and achieved in a crude way, all the things we thought of and set out to achieve with Aeroplast as an antibacterial, occlusive surgical dressing.

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Or there's another way of using it which is especially good in oozing or bleeding wounds (Wexler *et al.* Am. J. Surg., Oct., 1956). Spray one light coat, then apply a layer of gauze before the coat dries. Spray another coat, and apply a second layer of gauze and a third if necessary, depending on the amount of bleeding or oozing. The gauze will absorb the exudate, and when the time comes, the dressing is easily and cleanly removed.

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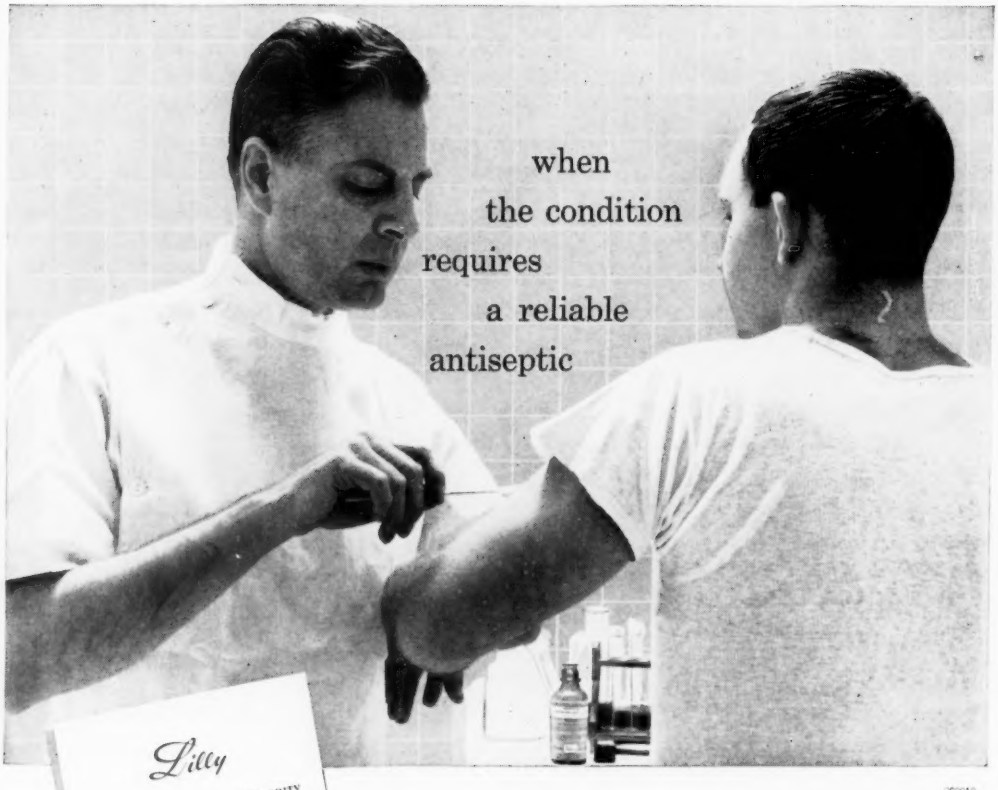

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INDUSTRIAL MEDICINE AND SURGERY

DECEMBER, 1956

Where Are We Going in Workmen's Compensation?

CHRISTOPHER LEGGO, M.D., Menlo Park, California

THE QUESTION, "Where are we going in workmen's compensation?" will be answered variously, according to what an egg-head would call the frame of reference of the speaker. The optimistic plaintiff's attorney, in some states, has good reason for saying, "We are going to collect." The employer or his insurance carrier in those same states is giving a valid answer when he states, "We are going to pay." This author has encountered a difficulty, which he may not have solved to anyone's satisfaction, in defining his frame of reference. This difficulty highlights one of the main characteristics of workmen's compensation insurance, namely, that it is a subject the thorough study of which demands an approach at a state level.

When workmen's compensation insurance is discussed at a national meeting, statements regarding its operation are likely to make sense to one person out of 48, unless the territories and various Federal agencies are also represented, in which case the proportion will be one out of 60 or more. On the other hand, there must be some phenomena common to many claimants, employers, insurance carriers, Compensation Boards, or physicians which will lend themselves to discussion and apply with some degree of uniformity regardless of the geographic location in this country. To identify and discuss a few of these phenomena is the aim of this paper.

The question, "Where are we going?" leads naturally to the question, "Where have we been?" We will discuss then, for a minute, where we were before the introduction of workmen's compensation insurance laws, which we arbitrarily define as being that time previous to 1911, at which date the incubation period of legislation ended and the country began to break out in a rash of workmen's compensation insurance acts. It was a period when both the frequency and the severity of the industrial injury were high and the probability of an injured individual collecting any damages, let alone high damages, from his employer was conversely very low. We have heard many times of the three statutory defenses which are waived under compensation acts, namely, the assumption of risk, contributory negligence, and the "fellow servant" clause. In return for the loss of these defenses, the employer was given the protection of a ceiling on awards.

This inoculation against high awards seems to have been losing its immunity characteristics. In the first place some medical costs in the states which have granted unlimited medical care have proved to be large, in many cases being measured in multiples of tens of thousands of dollars. This extension of medical benefits is not a matter to be criticized without careful thought. Visualize a case where medical costs are limited by statute to $500 and the victim of a clear-cut industrial accident breaks his neck, suffers a complete paralysis from the neck down, and is condemned to around-the-clock nursing care for as long as he lives, and one will, I am sure, hesitate to enthuse over ceilings on medical benefits. The second erosion of the ceiling is appearing in the increase of subrogation cases. This is not a phenomenon on which I can pass judgment, although I do have some personal feelings when I read or hear of extremely liberal awards over and above compensation benefits for which the justification seems to have been purely the emotional condition of the jury. Finally, there is an announced intention at least to raise the ceiling, if not to blow the entire roof off limitation of awards, by the organizations of claimants' attorneys backed by representatives of organized labor.

It would seem, then, safe to prophesy that the trend will be towards higher ceilings and continued efforts to make the sky the limit. At first sight it would appear that the only effect of

Presented at the Portland Chamber of Commerce Third Annual Pacific Northwest Industrial Health Conference, Portland, Oregon, September 10, 1956.

higher ceilings would be to increase the cost of a number of cases. Further analysis of the situation would suggest that higher potential awards for industrial injuries increase the number of claims as well as the liberality with which dubious claims are ruled as being valid. This statement demands explanation.

LATE IN 1946 California introduced its Unemployment Disability Law. Previous to that time the average employee with a dubious compensation claim could be offered only a choice of no benefits on a "take nothing" award or the benefits of workmen's compensation if the claim were granted. There was a strong, inherent, well motivated, instinctive inclination on the part of the Industrial Accident Commission and its referees to give the benefit of any doubt to the employee. This was not in conflict with the philosophy of the compensation law. It must be remembered that workmen's compensation laws are set up for the benefit of employees. Legal authorities have been open in declaring it social legislation in response to the socialism of Germany at the time of Bismarck. The traditional court procedures of common law were discarded or abandoned at the hearing of the industrial accident cases in many, if not most, states. It was therefore not difficult for Compensation Boards in the interest of what they felt was substantial justice to give the benefit of the doubt—and even to stretch the doubt—to the applicant. Nor did this practice arouse universal resistance from employers as, election propaganda to the contrary, employers are not as a class without feeling for disabled employees. Neither did insurance carriers resist this trend much, as they statistically revised their premiums upwards and emotionally prepared themselves to pay a perceptibly larger number of claims each year.

There was, then, an atmosphere which encouraged liberality in the granting of awards and some degree of tolerance towards this trend on the part of employers. When passage of the Unemployment Disability Law was announced, there was a strong feeling that, since the applicant whose industrial claim was rejected would be entitled to unemployment disability benefits, the motivation to press unrealistic claims would be minimized on the part of claimants and the motivation to grant unrealistic awards on the part of the Commission lessened. It is only fair to state that this was my own prophecy, and I hope that any prophecy I make today will prove more accurate than was this one.

Actually what seems to have happened is quite interesting, regardless of whether it could or should have been foreseen. Since the unemployment disability benefits were in the majority of instances administered by the state, the claimant of these benefits was interviewed by a state employee who, in his loyalty to public funds, felt some responsibility in protecting them. He quite properly inquired as to whether there had been an industrial injury. There seems no doubt, however, that a practice grew up of explaining to the applicant that the unemployment disability benefits ran out after a given number of months and did not include complete medical and surgical and hospital costs and permanent disability awards or the other superior benefits of workmen's compensation insurance. There may have been some assistance rendered in jogging the applicant's memory as to what may have happened on the job, and this encouragement for the applicant to convert his disability into a much better subsidized industrial injury may well have extended beyond the call of duty to the suffering citizen. Be this as it may, there grew up a strong feeling that the Unemployment Disability Law, rather than being a backfire to cut off dubious claims, became a machine which found many and generated more.

What overzealousness exists on the part of these interviewers has been brought under some degree of—if not complete—control. There still exists, however, the marked discrepancy between the very liberal benefits, including unlimited medical care, under the Workmen's Compensation Act as compared to the maximum six months benefits of the Unemployment Disability Law. The greater the extent to which this discrepancy exists, the greater will be the pressure for the applicant to file, and for administrators to grant, claims.

Viewed theoretically, adjudication of compensation claims can be carried out much more realistically if unemployment disability benefits are raised to a level at or near that of compensation benefits. These latter costs are already so high in states such as California and New York that such a proposal appears completely unrealistic. It is possible, of course, that social legislation of the future may undertake, by governmental action, to distribute benefits which are comparable, if not identical. The ultimate possibility of such a development may be discounted but should not be written off completely.

THE AUTHOR has but slight sympathy with those who are currently advocating a model compensation law to be uniformly adopted by all states. He is inclined to agree that many states should, in fact must, show increased liberality in both their awards and their decisions. He is, however, far from convinced that it is economically practical to obtain uniformity by raising the benefits of less liberal states up to the level currently existing in the most liberal. He is even more convinced of the impracticality, for reasons involving social psychology, of obtaining uniformity by reduc-

ing benefits in those states which are now liberal. He is disturbed when he hears in radio newscasts examples of obvious injustices without any identification of the state in which the incident occurred. While these examples are presumed to be factual, they have been so extreme that he has never encountered any such decisions in any state in which he has lived or with which he is familiar. He has felt the implications of such publicity give a false impression to the listeners and paint a distorted, if not actually false, picture.

The physician himself is not immune from the social pressures we have described. He has been presented with an increasing number of precedents whether by Commission rulings, court decisions, Commission policies or "etiology by statute" which have slowly been altering his concept of cause and effect from that which formerly was based on medical precept alone.

Since this manuscript was prepared, a new book has been published, "Guides to Straight Thinking," by Stuart Chase. In it he describes 13 common fallacies with a chapter devoted to each. One is entitled "Cause and Effect, Post Hoc ergo Propter Hoc." Because many referees justify many of their decisions on just this type of fallacious reasoning, I believe this chapter is almost "must" reading for those of us interested in workmen's compensation. Chase says, "Chanticleer, the cock in Rostand's play, observed that after he crowed the sun came up. Therefore, he reasoned, his crowing caused the sun to rise. This illustrates perfectly what logicians call the post hoc fallacy. When one event precedes another event in time, the first is assumed to cause the second."

The "aggravation of a pre-existing condition" clause is the ground in which "post hoc" decisions flourish. Not only have they flourished and thrived, they have been flourished at us and brandished in our faces so often that I believe we are all in danger of abandoning our ability to think straight in terms of cause and effect in regard to an alleged industrial injury. At the employee level, post hoc reasoning confronts us in the syndrome which is, or should be, known as the "Mustov Disease." The pathognomonic sign of this disease is the sentence, "I have never had it before so it 'must of' happened here at work."

Unrealistic awards based on "post hoc" reasoning have been attacked by employers as expensive. They are expensive. They are looked upon as being a barrier to employment of the applicant with a physical defect. They do tend to erect such a barrier. But I am inclined to believe that neither of these effects is the most serious. I believe the most serious effect of such "post hoc" awards is the erosion of sound reasoning, the discrediting of logic, and the encouraging of imagination to recall a nebulous event to be conjured into a firm conviction that the event transpired. I believe referee, doctor, lawyer, employer, claims agent, business agent and employee alike are falling victim to the "post hoc" phenomenon. Personally I have begun to feel that years of exposure to "post hoc" decisions have brain-washed some of us to the point where we must re-evaluate our own thinking on the industrial injury. I suggest we watch our "therefores," our "sinces," and our "resulted ins." The phrase "followed by" is not synonymous with "caused by," nor does "could have happened" describe an historical event. We have reached our present wonderland of awards hanging on every post in the "post hoc" decisions gradually. We did not step like Alice suddenly through the mirror. But now that we are there we must find the mirror to examine ourselves and our actions searchingly. My own quick glimpse has not pleased me.

"Post hoc" reasoning is a two-edged sword. Those who gain by it today may lose by it tomorrow if it is turned against them. Its lessened use will reduce awards which its use would grant. But I cannot feel that the loss of a "fast buck" is too great a price to pay for sound reasoning and straight thinking.

THEORISTS tell us that the doctor must stick to the "medical facts" and leave the adjusting of the claim to the legal profession and their lay colleagues. In actual practice the doctor is called on to express his professional opinion as to whether there was or was not a causal relationship between the condition and the alleged event or, if he can not positively say there was such a relationship, to express his opinion as to whether the relationship was "possible."

It is our belief that in spite of himself the doctor is more and more being drawn into a position of becoming a claims adjuster, a part he is neither trained nor equipped to play. The environment in which the game is being played not only causes an awkward situation for the doctor but facilitates the catching of his inevitable fumbles by the claimant's offense much more frequently than the employer's defense.

Previous to the introduction of the compensation laws, the clinical diagnosis of a patient was based on the history and the physical examination. Furthermore the patient had only one reason to seek the doctor's help, namely, relief from his complaint. There were few reasons a generation or two ago for a patient to distort, let alone falsify, his medical history to his physician. In the dubious compensation claim the falsified or distorted history is recorded and plays an extremely important part, and sometimes is almost the sole factor dictating the opinion on which the claim will be decided. Whether the falsification is conscious, as it may be, or subconscious, as I be-

lieve it is most often, the result is the same.

What answer will be found for this dilemma I do not know. It may be that more careful history-taking and recording of what doubts the doctor may have as to its validity, will be a help. It may be that an earlier and more careful investigation of the facts by employers and their representatives will be a help. It may be that earmarks of suspicion will develop into a pattern that will be identified by the adjudicating boards. It may be that a more secure economic position on the part of employees will lessen the conscious or subconscious need to strengthen the weak claim.

We are involved, after all, in a broad social problem. It can not be described as a medical problem, nor a legal problem, nor a legislative problem, nor an administrative problem, nor an economic problem. It is all these and more. Each of these areas is involved in the problem and has a particular problem of its own.

We have seen the inadequate individual, time and time again, distort his history of injury, exaggerate his symptoms and cling to his compensation claim because it constituted his only asset; nor will the psychiatrist talk him into relinquishing his only straw of support. The presenting problem is a dubious compensation claim; the underlying problem is the patient's social inadequacy. The long-term minimizing of these cases lies in the improvement of the environments which produce social inadequacy.

We have all seen the marked increase in the reopening of closed cases coincidental with a dip in our economy when employees with old injuries lose the security of their jobs. Regardless of the rationalization of these earnest-eyed and apparently physically miserable plaintiffs, their physical conditions have not recurred acutely without reason. The reason lies in our economy, and the ultimate help must come from our political economists. Much has been said about the merits of lump-sum settlements *versus* periodic payments, or about substituting rehabilitation methods in place of either. It may be that adequate rehabilitation facilities exist today, provided the motive for recovery is sufficiently strong. Delays in settlement and the harassment of litigation may contribute to the prolongation of a disability. Prolonged enough, this disability may become a permanent pattern. Sometimes it seems, however, that those who are assisting the claimant towards his pot of gold (paltry in value compared to his potential earnings) are unwittingly working in opposite directions at the same time. If they can develop methods which motivate the patient's recovery and hasten his return to useful productivity while they are procuring him the financial assistance he requires, they will be rendering him a greater service than they are able to with their present efforts.

LET NOTHING in this paper be interpreted as indicating that the author feels we should go back to any point in workmen's compensation which we have already passed. In their entirety, the workmen's compensation acts represent real social progress. Viewed historically, they are newer than the battleship or the automobile. Neither the new battleship on its shakedown cruise nor the new car on the proving grounds at Detroit is destroyed because of the flaws they demonstrate. Those parts which develop flaws will be redesigned and the result will be a better operating, if not a perfect, ship or car. The Navy will not go back to the sailing vessel, nor Detroit to the horse and buggy.

Immediately, we may expect increased and probably effective pressure for higher ceilings or no ceilings on compensation benefits. These will increase the gap between higher compensation benefits and the relatively lower unemployment disability benefits. There will follow pressures to raise the latter to correct this discrepancy, and so the spiral will continue. Beyond this I cannot see, except to speculate that, unless this spiral is controlled, financial costs may ultimately grow beyond the capacity of individual taxpayers, policyholders, or employers. There is no compensation law, state or Federal, that does not have its "bugs." Changes will be made in them all, some rapidly and some slowly. Some of those changes, while minimizing the flaws they are intended to correct, may bring new problems which are even more difficult to cope with. Over the long term we can look forward to improvement in the administration and operation of these laws, not day by day but generation after generation, as part of broad improvements in the enlightened society of which they are symbolic.

(3838 Alameda.)

Ten Minutes for Dividends

THE AVERAGE manufacturing company, according to a release from the National Association of Manufacturers, requires three hours and 55 minutes of the eight hour day to pay for materials and supplies. Meeting wages and salaries accounts for two hours 19 minutes more. Taxes, repair and replacement of facilities, research and promotion, consume the income from most of the rest of the day. Finally, there are 19 minutes left to go into profits, and almost half of that is earmarked for reinvestment in the business. —From an Editorial in *Personnel Journal*, September, 1956.

A Screening Test for Achlorhydria Without Intubation

—A SURVEY OF 90 MALES OVER 40 YEARS OF AGE

ANDREW E. BERTONE, B.S., Laboratory Director, and HARRY A. SINCLAIRE, M.D., Clinical Director
Medical Department, Socony Mobil Oil Company, Inc., New York City

THE USE of cation exchange indicator compounds to determine the presence or absence of free hydrochloric acid without intubation was described originally by Segal, Miller, and Morton in May, 1950. Cation exchange indicator compounds are prepared by replacing the hydrogen cations of the carboxylic acid groups present in cation exchange resins with cations which are not normally present in the body, and which can be replaced by hydrogen cations to determine the presence of free gastric hydrochloric acid. Such cations, called special indicator cations, must be non-toxic, readily absorbed from the stomach or small intestine, and easily detectable in the blood, urine or saliva.[1]

Diagnex employs carbacrylic quinine resin, two grams of which is administered orally, one hour after gastric stimulation with 250 mg. of caffeine sodium benzoate. Urines are collected one hour after ingestion of caffeine sodium benzoate labeled as "control," and two hours after the taking of the resin labeled as "sample."

The "control" and "sample" excretions are examined by extracting any quinine present by the ether-sulfuric acid technique described by Kelsey and Geiling.[2] The fluorescence of the "control" sample of urine should first be determined. If the results show fluorescence corresponding to 15 micrograms or more of quinine, the entire test must be disregarded. The report will indicate that the patient is excreting excessive amounts of blank fluorescent materials and the test will have to be repeated after a week during which the intake of interfering materials is to be eliminated. The material which interferes with the quinine assay must be ether soluble, have ionization properties akin to quinine, and an excitation wave length that is near maximum at 3400-3800 A. The following commonly used drugs produce fluorescence of interference, and if taken within three to seven days before the Diagnex test may seriously alter the result of the quinine assay, namely, acetanilid, acetylsalicylic acid, atropine sulfate, aminopyrine, bismuth subsalicylate, ergot alkalcids, quinidine, most synthetic anti-malarials, rauwolfia alkaloids, vitamins (particularly B Complex and C).

Many additional drugs which have less widespread use also may cause fluorescence, and may interfere with the quinine assay. Moreover, some drugs which do not themselves interfere with the test are converted in the body into substances which do interfere. Steroids, ketosteroids and cortisone have no appreciable effect on the quinine assay.

The degree of fluorescence observed in the "control" urine may be regarded as a reliable means of detecting the presence of interfering materials. Since the degree of fluorescence sufficient to interfere with the performance of the test is not generally seen in the control, no difficulty with the Diagnex test should be anticipated.

The amount of quinine present in the aqueous sulfuric acid extract of the "sample" is ascertained approximately by observing the intensity of fluorescence when the solution is viewed in ultraviolet light and comparing it with standard concentrations of quinine hydrochloride. If the result in the control urine corresponds to 5 to 15 micrograms of quinine, the amount of fluorescence can be subtracted from the amount of the fluorescene in the sample.

The interpretation of the urine "sample" is as follows: Twenty-five to 30 micrograms or more of quinine indicates the presence of free hydrochloric acid. Fifteen to 25 micrograms indicates a range in which the possibility of hypoacidity is not ruled out. A finding of 15 micrograms or less indicates an absence of free hydrochloric acid, and a diagnosis of achlorhydria is indicated.

Certain clinical conditions such as pyloric or intestinal obstruction tend to invalidate the test; persistent vomiting from any cause will interfere

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with the absorption or retention of the quinine; rapid emptying of the stomach due to partial gastrectomy may result in low values; and advanced renal failure may interfere with quinine excretion and result in low values.

The only important contraindication for the Diagnex test is known sensitivity to quinine. However, since the total quinine available in the resin is only one-tenth of the therapeutic dose, pharmacological side-effects are negligible.[2]

Many studies comparing intubation to the Diagnex technique are quite conclusive as to the correlation in cases of gastric anacidity. Pollard and Bolt report a high degree of accuracy of the Diagnex test in distinguishing achlorhydric patients from those secreting free hydrochloric acid. It has thus far proved to be a reliable method for determining the presence or absence of free acid and currently is being used as a screening procedure in their routine check-up to detect patients with achlorhydria.[3]

The experience of the University of Minnesota group suggests that the determination of gastric acidity by this technique (Diagnex) serves to pick up gastric lesions.[4]

The test should be mandatory in pernicious anemia individuals, and should be repeated frequently in any achlorhydric person with symptoms not adequately explained.[5]

The frequency with which achlorhydria does accompany gastric malignancy, atrophic gastritis and gastric polyp emphasizes the importance of determining gastric acidity.[6] Absence of free hydrochloric acid occurs in most cases of gastric carcinoma and far advanced chronic gastritis, in many cases of pellagra, and sometimes in hysteria and pulmonary tuberculosis. Achlorhydria is a constant and important symptom of pernicious anemia even during remissions. It sometimes appears long before any anemia is recognizable.[7]

Achlorhydria and marked hypochlorhydria are found in about 70% of carcinomas of the stomach (Hurst). Vanzant has shown that the proportion of cases of achlorhydria among normal individuals increases with age, and that about 26% of individuals examined at the age of 80 years have achlorhydria.[8] Bennett and Pyle, in a study of 100 healthy male subjects, found achlorhydria in 40%. In the general run of hospital cases without gastric distress or pernicious anemia 14% to 20% showed anacidity. These cases were without histamine stimulation. The failure of acid to appear after the injection of histamine is referred to as true anacidity. The Diagnex test determines true anacidity because of the stimulation with sodium benzoate. Achlorhydria after stimulation in the presence of any gastric lesion must be regarded as cancer until proved otherwise.[10]

Achlorhydria is common in chronic hypochromic anemia. Most students of the subject agree that achlorhydria is of etiological significance in the production of iron deficiency. Utilization of iron by achlorhydric patients was found to be as low as 3.1%, whereas in patients with normal gastric secretion and similar anemia 11.8% of the iron given was used. In chronic hypochromic anemia, achlorhydria is a common finding. As many as 83% of cases fail to secrete hydrochloric acid in response to the Ewald test meal, and 50 to 60% of cases after the injection of histamine have failed to cause secretion of HCl. Some writers consider achlorhydria a fundamental feature of the anemia and consequently designate it as "simple achlorhydric anemia." Failure to secrete free HCl after stimulus is so characteristic of pernicious anemia that in the absence of this finding a diagnosis of Addisonian anemia must be made without hesitation.[11]

THIS SURVEY was conducted at the Medical Clinic of the Socony Mobil Oil Company. The patients were selected from those who were having periodic physical examinations at the clinic. The only criteria for selecting them was that they were over 40 years of age and that they were willing to cooperate in the survey. Occupations varied from porter to executive. No undesirable effects of the quinine in 90 tests were encountered. The procedure of the test was explained to each patient, and a time to perform the test was arranged. Most of the patients found it more convenient to collect the samples on a Sunday morning, at home, and bring them to the laboratory Monday. Others collected the first sample at home and reported to the laboratory to pass the second.

The age group was from 40 to 64 years, with the average age 49.9. Of the 90 tested eight, or 7.7%, showed an achlorhydria. Five of the eight who showed achlorhydria had a past history of gastrointestinal complaints. Two of the eight gave a family history of gastrointestinal disease. All eight at this time have a negative G.I. series, although they should all be given the Diagnex test again in one year, and another G.I. series should be done if they again show achlorhydria. One patient was given a histamine test meal and a fractional gastric analysis was performed. He was found to have achlorhydria by this method also. A Papanicolau smear of gastric washing was negative for malignancy cells. The hemoglobin of all the achlorhydric patients was normal in this survey.

SUMMARY: The Diagnex test proves to be a good screening test for achlorhydria, without intubation. In 90 patients over the age of 40 tested, eight, or 7.7%, had achlorhydria. None of these patients had a positive finding on gastrointestinal x-rays at this time, nor did they have evidence of anemia.

The Diagnex test appears to be an easy and inexpensive screening method of determining achlorhydria in ambulant patients.

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High Blood Pressure as Bad "Heart Habit"

PROGRESS has been made in medical treatment for hypertension with the use of drugs. But the cause in most cases is still unknown and, in fact, medical opinion inclines to the belief that not a single cause but many complex factors are responsible. Some have suggested that one of these many factors may be a kind of cardiovascular bad habit. They think that the heart and blood vessels may be conditioned to high blood pressure by repeated stress or other stimuli. Results that tend to support this belief have been compiled recently by Dr. W. Horsely Gantt and his associates in the Pavlovian Laboratory of the Phipps Clinic at Johns Hopkins University. Dr. Gantt, a psychiatrist, studied 1925-29 in Russia with Dr. Ivan Pavlov, the physiologist who first demonstrated the conditioned reflex, a method by which the body adapts to its environment. It was known for some years that emotions like fear or anger could cause the heart to beat faster. But cardiologists and physiologists did not think the heart could "learn." However, after some years of study, Dr. Gantt and his associates found that the heart beat can accurately adapt to the animal's experiences. Like any other muscle the heart "learns" and like any other it can be conditioned. In fact, Dr. Gantt believes the heart forms habits more quickly than many other muscles and drops these habits with more difficulty. The organism "remembers with its heart" when it has forgotten other muscle movements. The organism can sometimes become "like a museum of antiquities" or, stated another way: "the organism is being pounded by past emotional memories, which prepare it for an act no longer required." Could this be the case in some kinds of hypertension? In the past three years Dr. Gantt and those working with him have gathered data which indicate that high blood pressure, as well as alterations in the rate of the heart beat, can be obtained by conditioning. Dr. James W. McCubbin, of the Cleveland Clinic Research Division, and his associates have reported observations possibly related to the conditioned reflex in high blood pressure. This group studied certain nerve endings called baroceptors in the aorta and in two neck arteries (carotids). These organs are part of the mechanism that controls blood pressure by regulating heart rate and blood vessel width. Dr. McCubbin and his associates found that under certain conditions the baroceptors "learned" bad habits. They learned to accept a new high blood pressure level as normal and acted to maintain it at the high level, a reversal of their usual function. Dr. Gantt has been studying the effect of certain drugs upon animals to see if it is possible to protect the heart against the formation of bad cardiac habits. While this work has not yet been completed, studies so far with a few animals indicate that two of the so-called tranquilizing drugs that are sometimes used in treatment of hypertension have opposite effects on the rate of heart beat. Chlorpromazine was found to lower the heart rate; reserpine was found to increase it. Both drugs greatly diminished the animal's reaction to unexpected stimuli such as a flash of light. This reaction is the basis of an animal's normal alertness to a new stimulus but when it is exaggerated or prolonged it turns into anxiety and becomes a burden to the nervous system and the heart. Therefore, drugs which reduce this reaction might be of value in "giving the cardiac system a rest from the ordinarily distracting, alerting stimuli of the environment." At Yale Medical School Dr. Paul D. MacLean, Associate Professor of Physiology, and his collaborators, have reported that reserpine eliminated conditioned cardiac and respiratory responses in animals. This group suggested that the drug acted by modifying or abolishing conditioned responses which no longer served a useful purpose. Dr. Robert W. Wilkins, of Boston, the first Western physician to report on the clinical value of reserpine in high blood pressure, has called the line of investigation followed by Dr. Gantt and Dr. MacLean "one of the most exciting going on today." He suggested that "it may open up what has always seemed to me a neglected sphere in respect to the genesis of human hypertension . . . ."

—From *Heart Research Newsletter*, 1:4 (September, October-November) 1956.

Pitfalls in the X-Ray Diagnosis of Trauma to the Spine

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IN EVALUATION of injuries to the spine, x-rays must be skillfully employed if we are to avoid either over-diagnosis or under-diagnosis of trauma to the complex, multifaceted structures of the human spine. Either of these errors will result in injustice to one or more parties, especially if litigation is in prospect.

First, it should be emphasized that clinical findings and impressions must be carefully correlated with the roentgenologic examination. It is rare for significant x-ray findings of trauma to be present without definite localizing physical signs. The converse, however, is common, and it is here that our x-ray examinations must be most exhaustive and accurate to avoid error, for it is only human to seize on a non-traumatic abnormality or anatomical variation as the cause of the clinical signs. Equally, it is tempting to shrug away clinical signs on the basis of "negative" films when additional films might show the trouble clearly.

Space does not permit a complete discussion of the x-ray evaluation of traumatic lesions of the spinal column. This presentation has been designed to cover a few common injuries and some of the developmental variations, congenital anomalies, and disease processes which are sometimes mistakenly diagnosed as being secondary to injury.

A fracture or dislocation is not the only serious

Presented at the Sixty-Eighth Annual Meeting of the AMERICAN ASSOCIATION OF RAILWAY SURGEONS, Chicago, April 12, 1956.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 1 (left): In this AP view of the lumbar spine and abdomen the cardinal signs of retroperitoneal hemorrhage are well visualized—the lumbar spine is concave to the right as the result of muscle spasm and the psoas muscle shadows on the right are obliterated by retroperitoneal hemorrhage. No fractures of the transverse processes are seen. These changes were the result of a severe direct blow over a broad lumbar area. Fig. 2 (center): The 5th lumbar vertebra is the site of a double surface compression fracture secondary to a fall from a considerable height and a resulting "jack-knife" injury. The fracture lines extend through the body of the vertebrae involving both cortical surfaces and in consequence have separated the anterior fragments slightly so that the over-all anteroposterior diameter has been increased while the vertical diameter has been decreased. The patchy irregular increase in density is secondary to compression of cancellous bone. Fig. 3 (right): Here the 1st lumbar vertebra is the site of a typical superior cortical surface compression fracture with fragmentation and compression of the upper one-third of the body of the vertebra, particularly anteriorly. The anterior beaking is secondary to slight anterior displacement of the fragments.

Fig. 4.
The degree of deformity in transverse process fractures varies greatly, depending upon the amount of soft tissue injury and muscle detachment. In this case minimal deformity, gross deformity, and non-union are all visualized.

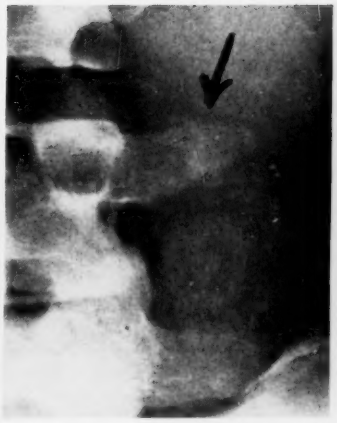

Fig. 5.

Fig. 6.

Fig. 5 (left): In this case of fracture of the transverse process of the 4th lumbar vertebra in a healing stage, the fracture line could be seen only after spot films made with compression technique to displace gas were made. Fig. 6 (right): In this case of transverse fracture of the mid-portion of the body of the 5th sacral vertebral segment diagnosis was made easy by anterior displacement of the distal fragment. In cases of undisplaced fractures, extremely careful attention must be paid to minor fracture lines as visualized in carefully made spot lateral films.

change that may result from severe trauma to the back. A single example will suffice to make this clear (Fig. 1). This young man received a direct blow over a broad lumbar area. The signs of retroperitoneal hemorrhage are clear cut — absent renal and psoas muscle shadows and scoliosis, concave to the side of the hemorrhage. Fortunately, the almost universal sequel to severe back injury, paralytic ileus, had not developed when this film was made, or the diagnosis would not have been so easy.

The most common injury to the back is the simple compression fracture. Fig. 2 shows a double surface fracture of the 5th lumbar vertebra. The characteristic increase in longitudinal diameter, the decrease in vertical diameter, and the patchy irregular increase in density are well disclosed.

In a single surface compression fracture (Fig. 3) we note characteristically an anterior wedging, slight anterior beaking and irregular increase in density confined to the upper one-third of the vertebral body. After a while new bone begins to develop. In time this new bone formation will result in localized hypertrophic spurring which, with the accompanying deformity, is the hallmark of the old compression fracture.

Fig. 7.

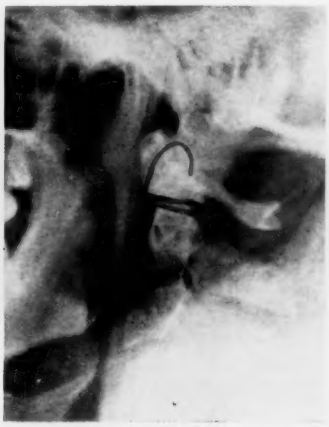

Fig. 8.

Fig. 7 (left): Here the 5th cervical vertebra has been displaced anteriorly with relation to the 6th as the result of a blow which has caused fracture of the mid-portion and base of the superior articular facets of the 6th cervical vertebra. Such a fracture almost always accompanies any significant subluxation of a vertebral body. Note also the fracture of the inferior articular facet of the 6th cervical vertebra. Fig. 8 (right): The entire 1st cervical vertebra and the odontoid process of the 2nd cervical vertebra may be displaced as the result of a fracture through the base of the odontoid process as seen in this case.

Transverse process fractures are common results of direct blows or muscle strain (Fig. 4). They are also perhaps the most commonly missed fractures. In this case of fractures of the transverse processes of the 2nd through the 4th lumbar vertebrae, we see healing with gross deformity, minimal deformity, and non-union, all in the

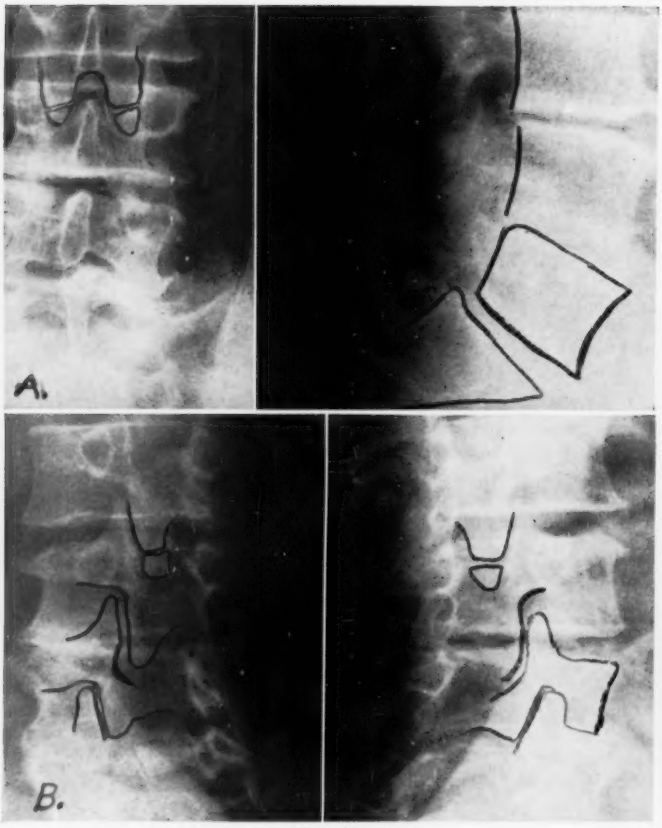

Fig. 9.

In advanced degenerative disease of the lumbar spine with narrowing of the discs and the lowermost apophyseal joints, anterior displacement of one lumbar vertebra on another, or of the 5th lumbar vertebra on the sacrum, may occur. Defects in the pars interarticularis need not be present. In this case an uncommon anomaly is also seen in the bilateral presence of accessory ossicles at the tips of the articular facets for the 3rd lumbar vertebra.

same case. Fracture of a single transverse process without displacement (Fig. 5) may be difficult to detect without special compression techniques to displace the overlying intestinal gas.

One often hears that sacral and coccygeal fractures are rare. I must agree with the "tail-end" of that statement, but sacral fractures are relatively common. These are best visualized in spot lateral films (Fig. 6). Antero-

Fig. 10.

In unilateral occurrence of accessory ossicles for the articular facets, the size differential between the normal and anomalous facet is easily seen as in this case of unilateral accessory ossicle for the left inferior articular facet of the 3rd lumbar vertebra.

Fig. 11.

This case illustrates a typical bilateral spondyloschisis with minimal spondylolisthesis. On the right we see three separate fragments, which is not an uncommon finding. The narrowing of the lumbosacral intervertebral disc which accompanies this deformity is also common.

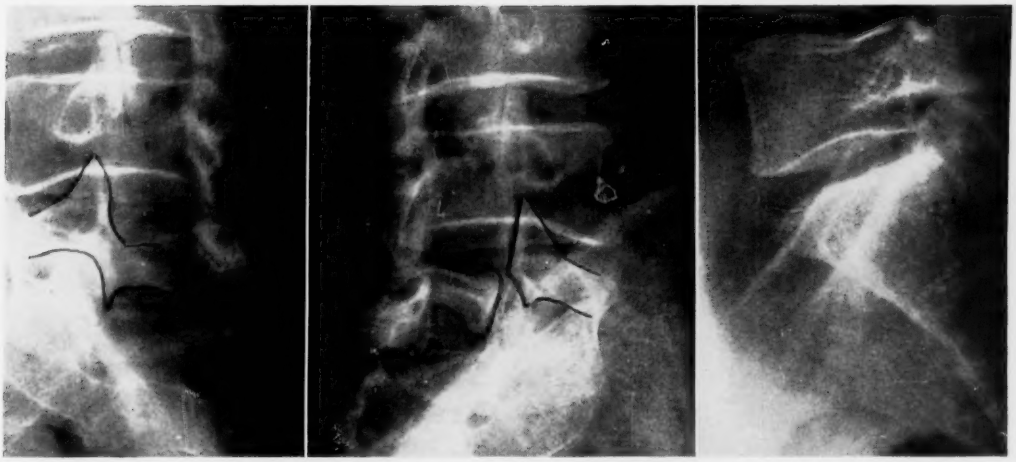

Fig. 12.

Here a unilateral spondyloschisis without spondylolisthesis is noted. This back was clinically unstable and symptomatic, illustrating the fact that spondylolisthesis is not necessary for symptoms to be present.

posterior films frequently fail because of overlying rectal contents, and these cases nearly always have rectal contents because it is painful for them to empty the rectum. Stereo-anteroposterior films may be helpful.

It should be remembered that dislocation or displacement of any segment of the spine, contrary to the dogma of the manipulators, is almost impossible without an accompanying fracture. In Fig. 7 we see a subluxation of the 5th cervical vertebra on the 6th cervical vertebra, secondary to fracture of the superior facets of the 6th cervical vertebra. Note also the undisplaced fracture of the inferior facets.

Fracture-dislocation of the odontoid process (Fig. 8) is also an unusual lesion.

It is germane here to discuss two other causes of vertebral displacement. Anterior displacement of one lumbar vertebra with relation to another or to the sacrum may occur, secondary to narrowing and degeneration of the disc and apophyseal joints (Fig. 9, A and B). Note that no defect can be detected in the neural arch such as is seen in spondyloschisis. This displacement may be progressive within limits.

In the case illustrated in Fig. 9 an interesting and uncommon

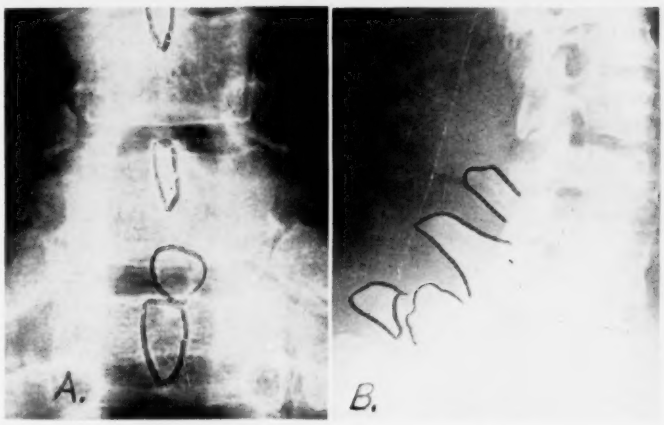

Fig. 13.

In this case of so-called "clay shoveler's" fracture of the spinous process of the 1st thoracic vertebra the lesion is most clearly visualized in the oblique projection but can nearly always be suspected from the presence of the overlapping or separated shadows of the fragments in the AP projection.

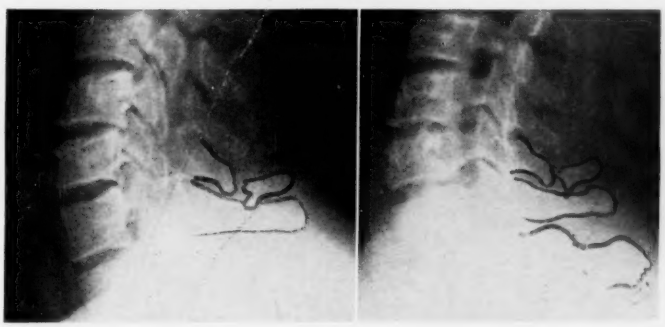

Fig. 14.

This case illustrates the value of multiple projections in showing the very minor fracture of the tip of the spinous process of the 1st thoracic vertebra which could not be seen in either the true lateral or AP projections. The fracture of the mid-portion of the spinous process of the 6th cervical vertebra was clearly visualized in all views.

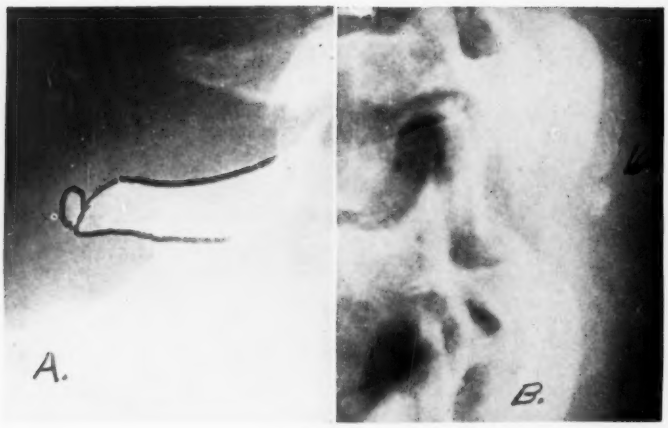

Fig. 15.
Accessory ossicles at the tip of the spinous process of the lower cervical vertebrae are quite common and should not be confused with fractures. The ossicles are always smooth and rounded and no defect is noted from which they could have arisen. The two cases shown here illustrate accessory ossicles for the 7th cervical vertebra spinous process and that of the 8th thoracic vertebra.

Fig. 17.
This case illustrates both the active and healed stages of osteochondrosis of several upper lumbar vertebrae showing the late deformity of the body of the 1st lumbar vertebra which is frequently confused with old, healed compression fractures. This deformity is particularly common in the thoracic spine.

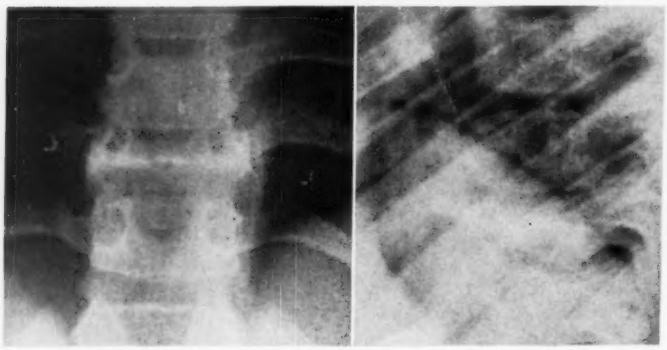

Fig. 18.
Osteochondrosis of the entire body of the vertebra as shown here gives rise to a characteristic gross deformity which could be on the basis of trauma only if the vertebral body was previously destroyed by a tumor.

Fig. 16.
This illustrates a severe osteochondrosis of multiple thoracic vertebrae which should not be confused with compression fractures. The degree of deformity arising from this disease depends, of course, on the severity of the process and the number of vertebrae involved.

developmental variation is also seen in the form of bilateral accessory ossicles for the inferior facets of the 3rd lumbar vertebra. These are often mistaken for fractures, but should not be, since these anomalous facets are always larger than normal.

This difference is more easily detected in unilateral occurrence (Fig. 10). True spondyloschisis with or without actual anterior displacement, is an abnormality which has caused a great deal of controversy in both clinic and courtroom. Many today feel that these defects in the pars interarticularis are actual fractures incurred in neonatal life or early childhood. Two or more fragments may be present (Figs. 11 and 12). This defect may rarely occur in adult life as the result of injury, and can be diagnosed with difficulty by paying careful attention to the edges of the fragments, and the history, and physical signs.

Spondyloschisis and spondylolisthesis are among the causes of unstable backs which can be easily found in adequate pre-employment x-ray examinations. Parenthetically, I hope all heavy industry personnel departments will

Fig. 19.

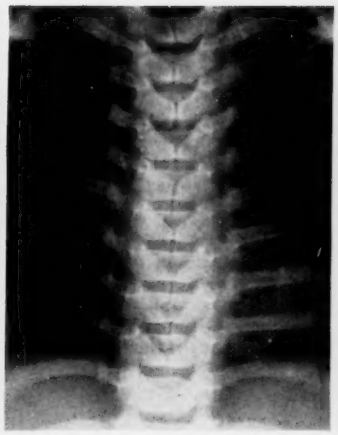

Fig. 20.

Fig. 21.

Fig. 19 (left): Unfused superior cortical epiphyses in the 3rd and 4th lumbar vertebrae are often confused with fractures but should not be, since the appearance is characteristic. This also illustrates a healed stage of an osteochondrosis of the superior cortical epiphyseal plate in the 2nd lumbar vertebra. Fig. 20 (center): Spina bifida of the degree shown here is almost never of clinical significance whether present in one or multiple vertebrae. Fig. 21 (right): Spina bifida of the degree shown in this case is always symptomatic, particularly when accompanied with multiple other congenital anomalies of spine and ribs. Cases of this sort are, of course, not seen in industrial practice, but this illustration is included for a contrast with the normal spina bifida occulta.

Fig. 22.

Fig. 23.

Fig. 22 (left): Hemivertebrae such as demonstrated here on the left between the 4th and 5th lumbar vertebrae undoubtedly give rise to unstable backs but must never be confused with sequelae to trauma. Fig. 23 (right): Unsuspected underlying disease may become acutely apparent following injury, as in this case of aneurysmal bone cyst with complete destruction of the pedicle on the left for the 11th thoracic vertebra. Identification of such underlying disease and recognition of it as non-traumatic are important.

come to realize the thousands of lost man hours and millions of dollars of insurance and litigation money such screening would save. I know that the Medical Departments already realize these facts.

Before I go on with non-traumatic abnormalities, I should like to show another type of fracture which is often missed. The so-called "clay-shoveler's" fracture of the spinous process of the last two cervical vertebrae or 1st thoracic vertebra can be visualized in the double "O" sign in the anteroposterior view but is best seen in the oblique and flexion lateral views (Fig. 13). Multiple views of any segment of the spine should be routine, with special views being taken as indicated (Fig. 14). This case illustrated visualization of only one fracture in one view, but of two in another. Anomalies can simulate even spinous process fractures but can be distinguished by applying the rule of "two parts cannot be greater than the whole." I should emphasize that all cases of anomalies presented here were found in patients with no history of injury (Fig. 15).

Perhaps the most frequent villains in the production of lesions confused with fractures are Scheuermann's and Calve's diseases, or osteochondrosis of the cortical epiphysis and vertebral body respectively (Figs. 16, 17 and 18.

In a severe case of Scheuermann's, it is easy to conceive of an inexperienced observer calling the deformed vertebrae "multiple compression fractures." Vertebra plana, or Calve's disease, usually involves a single vertebra and causes no sharply angled kyphosis of the degree which would result from a fracture of such severity.

In my experience, the next most commonly miscalled fracture is the unfused superior cortical epiphysis (Fig. 19). Vertebrae just don't break

"thataway," and again the rule of "two parts greater than the whole" applies.

I should like to plead for recognition of the fact that a spina bifida occulta in cervical, thoracic or lumbar spines means little, and in evidence (Fig. 20) present a case of a healthy boy with spina bifida from the 2nd to the 9th thoracic vertebrae. Symptomatic spina bifida, of course, is another story (Fig. 21), but then a person with this affliction won't be "workin' on the railroad."

Undeveloped articular facets and hemivertebrae (Fig. 22) are obvious as causes of unstable backs and require little discussion. Variations in angles of articulation and transitional vertebrae are controversial.

It should be remembered, too, that individuals with pre-existing underlying disease may also be injured. Identification of such disease is important in a medicolegal sense (Fig. 23).

In summary, look carefully before you say "no fractures," and look again before you say "fracture" on the basis of a normal variation.

Bureaucratic Medicine 13th Century Style

BECAUSE the science of medicine can never be known unless some knowledge of logic is first acquired, we decree that no one shall study medical science unless he has first studied the science of logic for at least three years; after this period of three years, if he wishes, the student may advance to the study of medicine to which he must devote five years, in such wise that he shall within the prescribed period of study, learn in addition that field of medicine which is surgery. After this and not before, he will be granted a license to practice as a doctor, provided he has first attended an examination of a form prescribed by the Government, and has also received a testimonial from his master certifying that he has completed the prescribed period of study. A doctor shall swear that he will observe the regulations fixed by the Government up to this time; that, in addition, he will denounce to the authorities any pharmacist who, in his knowledge, prepares drugs under the required strength, and that he will give freely of his advice to the poor. A doctor shall visit his patients at least twice a day, and, at the request of the patient, once during the night; he shall receive from the patient for a day-visit, provided he has not been called beyond the city or village limits, not more than half a tarenus of gold. If he has been summoned beyond the city limits, he shall receive not more than three tareni if the patient pays the expenses. A physician may not make contracts with the pharmacists or receive any of them under his patronage for the payment of a fixed sum, nor may he have his own shop. Pharmacists are to prepare a concoction at their own expense and must have a prescription from a doctor in accordance with our regulations, nor shall they be allowed to keep preparations unless they have taken an oath; they shall prepare all their medicines in the prescribed form without fraud. Moreover, the shopkeeper shall be payed for his medicines in the following manner: For compounds and simple medicines which are usually kept in stock not longer than a year after the time of purchase, for any ounce he shall be empowered and permitted to receive three tareni. For others which because of the nature of the drugs or for some other reason must be kept in stock longer than a year, for any ounce he shall be allowed to receive six tareni. Shops of this kind shall not be allowed everywhere, but only in certain cities throughout the kingdom as shall be described below. No doctor shall practice after the completion of the five year period who has not practiced for an entire year under the direction of an experienced doctor. During the period of five years the masters shall teach in the schools the authenticated books of both Hippocrates and Galen, and shall instruct in the theory as well as in the practice of medicine. Moreover, we decree as a measure for the public health that no surgeon shall be admitted to practice who does not present testimonials from masters in the faculty of medicine, stating that he has studied for at least a year in that field of medicine which develops skill in surgery, in particular, that he has learned in the schools the anatomy of human bodies, and that he is proficient in that field of medicine without which incisions cannot be safely made nor fractures healed.

—From the Imperial Constitution published by Frederick the Second of Hohenstaufen in 1231. Translation reproduced from "Medical Regulations of Frederick the Second of Hohenstaufen" by Edward F. Hartume, M.D., Medical Life, Vol. 41, December, 1934, as reprinted in *The Detroit Medical News*, November 12, 1956.

Ex-Tuberculosis Patient as an Employee

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Central Washington Tuberculosis Hospital, Selah, Washington

WHEN a discharged tuberculosis patient applies for a job, industry has three main concerns: first, is the prospective employee contagious, second, does this person have adequate pulmonary function to carry on a gainful occupation, and third, will he reactivate if employed. The incidence of tuberculosis remains essentially unchanged and this, coupled with the low death rate resulting from new methods of treatment, means that increasing numbers of patients are being released and will be seeking jobs.[1] This is an evaluation of what can be expected from these patients based on a program that was four years old June 1, 1956, in which all patients have been returned to their previous occupations regardless of physical exertion immediately upon discharge from the hospital. None of these patients received rehabilitation training for lighter work.[2,3]

Reactivation of tuberculosis occurs because viable tubercle bacilli are still present in the tissues of the patient. When resected specimens from patients with active pulmonary tuberculosis were cultured after several months of streptomycin and P.A.S. it was difficult to recover viable tubercle bacilli using accepted methods of culture.[4] Assuming, then, that the antibiotics had actually killed the tubercle bacilli, those patients who were ready for discharge during the first six months of 1952 were asked if they would return to their former occupations if their employers would accept them. The reasoning behind this plan was explained carefully to both the employees and employers and was put into effect on a voluntary basis. Almost all of the patients were anxious to return to work. By June of 1952 these ex-patients were still doing well so it became standard practice to return all of our discharged patients to their previous occupations. Those who were receiving public assistance and had no disability other than tuberculosis were given a maximum of six weeks to find employment and become self-sufficient. These people also were doing well by the end of the first year so that all discharges were reviewed from the time the hospital opened in January, 1950, to January, 1952, and all who had only tuberculosis as a disability were taken off the public assistance rolls and sent back to work.

On June 1, 1952, a radical change of treatment was begun at the Central Washington Tuberculosis Hospital, and all collapse therapy including pneumothorax, pneumoperitoneum, phrenic crush and primary thoracoplasty was abandoned along with rigid bed rest. Our patients were allowed full lavatory privileges and were sent to the cafeteria as soon as physically able after admission. To all patients admitted from that date on, a combination of the three best known and least toxic anti-tuberculous drugs, streptomycin, para-aminosalicylic acid, and isoniazid were administered. Early resectional surgery was done for the following indications (provided that they did not have complicating disease which would make resection impossible such as recent coronary artery occlusion or pulmonary insufficiency, etc.): (1) those patients positive after three months of combined drug therapy; (2) those with disease which will probably reactivate, such as bronchial stenosis, tuberculous bronchitis, bronchiectasis, caseous masses of 2 cm. or larger, and cavitary disease; (3) reactivations following collapse therapy or combined drug therapy; (4) those patients with a previous history of irregular discharges as seen in alcoholics, and (5) decortications after pleural effusion or previous pneumothorax to regain pulmonary function with resections of the diseased area of the lung. All cases of bone tuberculosis involving a joint were fused early, an average of 72 days after starting combined drug therapy.[5]

The results of this program were shown in a scientific exhibit, "Tuberculosis Today," in June, 1956, at the A.M.A. meeting in Chicago. It was composed of 330 consecutive admissions to this hospital with proved tuberculosis, either with a positive culture or positive pathology, admitted since June 1, 1952, and discharged by June 1, 1955. These cases cover all types of tuberculosis —primary, reinfection, pulmonary and extrapulmonary, and all age groups. Treatment has consisted of continuous and concurrent intramuscular streptomycin, gm. 1 twice weekly or gm. 0.5 for children, para-aminosalicylic acid, gm. 10 daily reduced according to weight in children, and isoniazid, 4 mg. per kg. of body weight. One hundred forty-two of these patients were operated on with 120 pulmonary resections, 17 fusions were done for bone tuberculosis, and five were

operated on for renal tuberculosis (three nephrectomies and two with operations designed to open strictures produced by tuberculosis). One hundred eighty-eight were treated with drugs only. Twenty died during hospitalization, nine with tuberculosis as the cause of death, and of these nine, six were in the medically treated group and three in the surgical group; 11 died from other causes. These patients were hospitalized an average of 212 days, and only two received drugs over one year. A. P. tomographs are done on all reinfection type tuberculosis at the end of three months of treatment, and if the pathology shown fits the categories under indications for resections, they are resected. Follow-up has been done on all but 32 of the live discharges. If any of these 32 had reactivated and become ill we would know about it because they would have returned for hospitalization or their x-rays would have been requested had they entered other institutions.

A tabulation of the occupations to which they returned after discharge follows, along with the number of reactivations in each group and the percentage of the group it represents. The occupations are broken down into caloric requirement with very light work requiring 1500-2000 calories per day, light work 2000-2500 calories per day, moderately heavy work 2500-3000 calories per day, heavy work from 3000-3500 calories per day and hard manual labor from 3500 calories up per day (Table I).

TABLE I.
PRESENT OCCUPATION

Number in Group		Reactivations	Total	Percentage in Group
28	Very light work			14%
	14 retired	4		
	14 pre-school children	0	4	
127	Light work			3.1%
	83 housewives	4		
	32 students	0		
	8 office workers	0		
	4 sales personnel	0	4	
55	Moderately heavy work			7.3%
	19 housework plus another job	2		
	19 foodhandlers	1		
	6 nurses and aides	0		
	5 engineers	0		
	4 cab and truck drivers	0		
	2 other	1	4	
81	Heavy work			11.1%
	33 laborers	6		
	25 farmers	2		
	11 carpenters	0		
	5 mechanics	0		
	3 painters	0		
	4 other	1	9	
9	Hard manual labor			11%
	5 loggers	1		
	3 steel workers	0		
	1 other	0	1	
			22	

18 Women have had 26 pregnancies with no reactivations.

It is obvious that those who did very light work had the highest reactivation rate and this is readily explained since these were aged patients with extensive tuberculosis and serious associated disease which made resection impossible. The low reactivation rate of 3.1% in the 'light work' category is due to the fact that a large percentage of the group were women and they come to the hospital earlier in the course of their disease than do men. For example, 50% of the minimal tuberculosis group, 45% of the moderately advanced, and 30% of the far advanced groups were women. In this total group of 330 patients, 185 were males and 145 were females. Of the 23 reactivations only six were women. Many may take issue with the placing of housework in the 'light work' category since the women carried on all of their chores including washing, ironing and scrubbing floors, but when caloric requirements are taken into consideration, few women need more than 2500 calories a day. In the past women patients were advised against pregnancy for fear of reactivation, however 18 of our women have had 26 pregnancies with no reactivations.

When the 22 reactivations with pulmonary tuberculosis tabulated in the chart are divided into medical and surgical groups, the latter group accounts for only four of the total—three doing heavy work (a laborer, a farmer and a plumber), and one doing moderately heavy work (a housewife with another job). Fourteen of the 18 in the medically-treated group who reactivated have been resected since and the other four have died of associated disease. The one reactivation from the hard manual labor group was among the first to be discharged and if he were treated today he would certainly be resected. One patient with renal tuberculosis has consistently positive cultures; he had one kidney removed several years ago elsewhere and has a stricture with a hydroureter and hydronephrosis with a pending uremia. Another patient with renal tuberculosis has had a recurrence of symptoms but we cannot recover tubercle bacilli.

These cases have all been out of the hospital over one year, and the average follow-up period is 21 months as of June 1, 1956.

The type of follow-up is important (Table II). One hundred thirty-nine of the discharged patients returned to the hospital for three days during which three gastrics were cultured using two different media (Lowenstein's and Petragnini's). Urine cultures were done if indicated. They were examined clinically, and routine chest x-rays were taken along with special x-rays if needed (for bone or renal tuberculosis). If the usual follow-up routine had been done, consisting of clinic visits plus x-ray and sputums if any, only 11 of the 23 would have been picked up. It has been our experience that patients may be positive for several months before x-ray changes are evident and before they will admit having sputum.

TABLE II.
FOLLOW-UP OF DISCHARGED PATIENTS

Number		Reactivations
139	X-ray plus gastric culture	13
6	X-ray plus sputum smear and culture	2
92	X-ray plus clinic visit	8
15	X-ray sent to us	0
13	Report sent to us	1
32	No follow-up	0
297	Total	

The extent of disease has been an important factor in determining the loss of pulmonary function and the probability of reactivation. During the first three or four months of combined drug therapy the clearing seen on x-ray represents restoration of function to these previously involved areas. This is the reversible portion of the disease. Therefore, the people returning to jobs after receiving only drug therapy should have as much if not more pulmonary function as they had when they left their positions. Resectional surgery is done to remove the irreversible disease and, as shown in Table III, those who have been resected have fewer reactivations than those who receive drugs alone. Using the new techniques of local resection of disease including wedge, segmental, lobectomy and combinations of these three, the loss of pulmonary function is less than that sustained from pneumothorax, and this loss of function depends more upon the amount of pleural reaction after surgery than upon the amount of tissue removed.[8] Briefly, then, if a man has adequate pulmonary function to do hard manual labor before he is hospitalized with tuberculosis, then he should have adequate pulmonary function to return to the same job after discharge.

Table III compares the results between the medically and surgically treated groups with reinfection type pulmonary tuberculosis, showing the number of patients in each group, average hospital stay, total amount of drug therapy, and the reactivations in each group.

There were no reactivations or resections in minimal pulmonary tuberculosis; they were hospitalized an average of 137 days with 196 days of streptomycin, 177 days of isoniazid, and 136 days of P.A.S. Because of the unpleasant taste of P.A.S. and the frequency of gastrointestinal complaints, it has not been given after discharge. Streptomycin is given after discharge by public health nurses, and the amount given is included in the totals.

Our patients are back to work, still receiving drugs usually about six weeks to two months after resection, as soon as we are assured that the postoperative gastric cultures are negative. Streptomycin often causes dizziness for six hours after shots, so when this is a problem the people are given their shots after work when they can lie down. Some complain bitterly. One ex-patient, a nurse anesthetist, was accused of being drunk after taking her streptomycin. By taking her shot at bedtime she could work comfortably.

When we compare those cases of moderately advanced tuberculosis who received drugs only with those who received drugs plus resection, the surgical group remained in the hospital only 45 days longer, they received about 90 days more streptomycin and isoniazid and 30 days more P.A.S., yet the reactivation rate in the surgical group is less than 2% and the reactivation rate in the medically treated group is over 10%. When we compare those cases of far advanced tuberculosis who received drugs only with those who received drugs plus resection, the surgical group remained in the hospital only 14 days longer, they received about 30 days more streptomycin and isoniazid and two days more P.A.S., yet the reactivation rate in the surgical group is less than 5% and the reactivation rate in the medically treated group is over 12%. Thus those patients who were resected have had fewer reactivations despite the fact that they are hospitalized only a few days longer than the medically treated group and have only a few more days of drug therapy. Of the 17 fusions for bone tuberculosis, none has reactivated even though they have returned to their previous occupations.

The six-county area this hospital serves is experiencing a tremendous increase in population owing to the large irrigation projects from Grand Coulee Dam, the construction of four large dams on the Columbia, and the construction and operation of the Hanford Atomic project. Agriculture, however, is the main source of income, with fruits, hops and sugar beets as the main crops. Because of the types of crops grown the agriculture workers fall into two categories, the year around residents and the transient laborers who move from place to place as each crop requires their services. This immediate area also has the largest Indian Reservation in the State of Washington. A significant percentage of our patients come from the low economic level, many cannot read or write, and for these people rehabilitation

TABLE III.

Surgical						Average Drug Therapy in Days	Medical					
Number of patients	Average hospitalization in days	Streptomycin	Isoniazid	PAS	Reactivations	CLASSIFICATION OF DISEASE	Number of patients	Average hospitalization in days	Streptomycin	Isoniazid	PAS	Reactivations
55	220	300	293	165	1	Moderately Advanced	97	175	210	210	135	10
65	262	310	306	166	3	Far Advanced	49	248	277	279	163	6

to a lighter job is impossible for they simply do not have the mental ability to learn. If we order these patients to do no manual labor then they have no alternative but to receive public assistance the rest of their lives. In our experience, those patients who could be retrained spent at least one year being rehabilitated then went to jobs that paid less than their original positions and before many months they were back at their old jobs out of economic necessity.

In this state, an employee in a tuberculosis hospital who develops tuberculosis has a compensable disease, since the Department of Labor and Industry considers it an occupational hazard. Because of this, the pre-employment examinations are very important. If an ex-patient is employed and reactivates, he also is covered by this law and may request compensation. A tuberculosis hospital, therefore, has the greatest risk in employing people who have had the disease. In the seven years that this hospital has been in operation we have had 376 employees, 14 of whom have had tuberculosis. Of these 14, seven had been hospitalized elsewhere and were hired when they applied for work; four other local people had x-ray changes on pre-employment examination and were hospitalized when their gastric cultures were positive—they were employed upon discharge; the remaining three were treated here as patients and were employed upon discharge. A nurse from another state who knew she had active tuberculosis applied here for work and tried to avoid being x-rayed. Had she been hired and put to work even for a month or two, she could have filed an unjustifiable suit for compensation. So far, we have had no reactivations among our employees who have had tuberculosis. Some may feel that the risk is too great in employing ex-tuberculosis patients, yet in reviewing the histories of our employees, the hazards of ordinary living have been greater than the possibilities of either contracting tuberculosis or reactivating, for several of our employees have died of heart disease, several others with carcinoma, one had a fatal automobile accident, and two others were critically injured in separate automobile accidents.

Table IV is a tabulation by occupation and number of the patients we have had from the Hanford Atomic Works over the last seven years. They are divided into two groups, the 25 who have been treated and the 17 who had short-term work-ups.

It is obvious that these men already have a trade which pays more than any white collar position to which they might be rehabilitated, and industry needs their skills. General Electric's Industrial Medical Operation of the Hanford Works has cooperated fully in returning these men to work. Using the three-day studies, we have recovered tubercle bacilli in over 90% of the cases with active tuberculosis. With this high degree of accuracy, those with slight or questionable x-ray changes are allowed to return to their jobs following the three-day studies, and they continue working unless their gastrics are found to be positive and then they are hospitalized. Those with obvious changes are not discharged after the three gastrics, but are started on combined drug therapy immediately.

TABLE IV.

For Treatment		For Workup—Because of X-ray Changes	
2	Mechanic	1	G. E. Supervisor
2	Patrolman	1	Chemical Engineer
3	Carpenter	4	Steamfitter
1	Industrial Mechanic	1	G. E. Operating Supervisor
3	Plumber	1	Timekeeper
1	Construction Worker	1	Bus Driver
1	Clerical	1	IBM Operator
1	Supervisor	1	Carpenter
1	Millwright	1	Welder
2	Power Operator	1	Sheetmetal Worker
1	Civil Engineer	1	Industrial Fireman
1	Steamfitter	1	Electrician
1	Industrial Engineer	2	Patrolman
1	Pipefitter	—	
1	Maintenance Supervisor	17	(3-day study)
1	Engineer		
1	Chemical Operator		
1	Anesthetist		
—			
25	(treated)		

All of the employees at the Hanford Project have routine physical examinations yearly including chest x-ray, and those who have had tuberculosis or have questionable x-ray changes and elect to come to us are followed at three-to-six month intervals and are also seen at clinic by a member of our hospital staff.

This working relationship between industry and the tuberculosis hospital has been beneficial to both, for in this case the pre-employment and routine physical examinations serve as an excellent case finding program and the hospital is able to return these employees to industry with an over 90% assurance that they can continue their jobs without reactivation. Of the 42 in this group, only one has reactivated.

These figures do not represent all of the cases of tuberculosis found in pre-employment examinations. Many of those found were not from this area and consequently were not eligible for hospitalization here but were returned to their own localities for treatment. Others who were veterans chose to go to veterans' hospitals.

Comment

VONACHEN *et al*[10] listed two pre-employment requirements for tuberculosis patients: first, they should not be contagious, and second, they should have periodic follow-up at a recognized clinic. We concur with these requirements. However, they recommended the use of sheltered workshops and long rehabilitation and neither of these suggestions is applicable in our situation.

None of our patients discharged since June, 1952, has had rehabilitation training; they were sent back immediately to their previous occupations, and we have no sheltered workshop facilities available to us. With our peculiar problems of transient labor, a large Indian population, and a predominantly agricultural community, 'light work' jobs are practically non-existent and those few who did turn to white collar jobs eventually resumed their former trades out of economic necessity.

Bogen and Skillen,[6] in their five-year follow-up of discharged patients from Olive View, found that the patients treated surgically did better than those who had temporary collapse procedures even though this surgery was primary thoracoplasty. Eighty percent or more of their patients out five years were working full time, some more than nine hours a day, even though they had been advised by the staff not to undertake extra strain. These ex-patients reported that rest periods during the day were impractical and even some shortness of breath was not too great a handicap. Davidson *et al*,[7] in their follow-up of excisional surgery patients, reported that 121 of their patients were on full-time activity working as waitresses, students, power-press operators, machinists, accountants, and 11 patients had returned to their former jobs.

The only reported program of returning tuberculosis patients immediately to their former occupations comes from the National Jewish Hospital in Denver[9] where 25 selected patients were hospitalized eight months and then discharged. The psychological benefits of this program were stressed in the paper, but no long term follow-up is available. If tuberculosis patients know they will have a period of hospitalization of six months or less, whether or not they are resected, and that they may return to their jobs upon discharge, the psychological value of this program is seen in the marked reduction of irregular discharges. We have had only 8% irregular discharges in this group of 330 consecutive admissions with proved tuberculosis, 10% in the medically treated group, and 5% in the surgically treated group, even though we have no occupational therapy program in our hospital and make no effort to entertain our patients other than television, radios, and library. We have found also that the patients who return immediately to work do not have the marked weight loss seen when they are discharged and placed on public assistance rolls.

When the reactivation rates of the medically and surgically treated groups are compared, the surgical group has had far better results, and when reactivation did occur it was due to disease on the other side. We feel that the type of pathology that remains in the body determines reactivation, and that physical exertion and pregnancy are not responsible. The period of hospitalization here continues to decrease so that for all cases treated in 1955, the average stay was 159 days, about the same period of morbidity following pneumonia before antibiotics were used; the mortality of less than 3% of our patients is about equal to the mortality reported on a large series of cases with pneumonia using modern drugs.

The present concept of rehabilitation was formulated during the 1930's when the average age of the tuberculosis patient was around 20 years. For the most part these people had no trade or profession and actually needed any educational facilities that could be given them. Today the picture is quite different, for the average age of tuberculosis patients is over 40 years and most of these people have already learned and profited by a trade or profession—those in this age group whose means of livelihood has been manual labor probably could not be taught a trade. By definition, rehabilitation means to make one capable of becoming a useful member of society again, and does not necessarily mean a change of occupation to light work as is generally thought with regard to tuberculosis patients. With this prevailing determination to find light jobs for tuberculosis patients, two big exceptions to this philosophy have been overlooked: first, are the countless people found through mass x-ray surveys with evidence of extensive tuberculosis who have had no treatment, have carried on gainful occupations, and who are totally unaware that they have had the disease; second, are the discharged patients who have defied their physicians' orders with regard to physical activity and yet have remained well.

Conclusions

THIS IS a report of our results in returning over 300 patients with proved tuberculosis to their former occupations immediately upon discharge from the hospital. The average follow-up period for all of these patients is 21 months as of June 1, 1956. Twenty-three patients have reactivated. The highest reactivation rate occurred in the group of retired people doing very light work. The lowest reactivation rate occurred in the housewife category because women are hospitalized earlier in the course of their disease.

Using combined drug therapy and local excision of destroyed areas, pulmonary function is not decreased as it was when collapse therapy was used. Thus, if a man had adequate pulmonary function to do hard manual labor before being hospitalized with tuberculosis, then he should have adequate pulmonary function to return to the same job after discharge. Those patients who were resected have had fewer reactivations despite the fact that they are hospitalized only a

few days longer than the medically treated group and have only a few more days of drug therapy.

Industry, using pre-employment examinations and routine x-rays, plays a very important role in tuberculosis case finding. Tuberculosis institutions today, by confirming the diagnosis and by using modern methods of treatment, can offer industry reasonable assurance that the patients can return safely to their former occupations upon discharge.

The marked shortening of hospital stay at the Central Washington Tuberculosis Hospital makes occupational therapy unnecessary. Because the average age of our patients is over 40 years, they already have learned and profited by a trade or profession, and if they have done only manual labor they very likely could not be retrained to any other type of work.

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No Monopoly

ONE POPULAR FALLACY currently being scotched is that business executives are more prone to heart disease than those in less demanding occupations. Relative age has far more to do with the possibility of having a heart attack, according to Dr. Paul Dudley White. Undoubtedly, heart conditions cause a great waste of fine executive talent — one of the few commodities genuinely scarce in today's business world — and there is good reason for businessmen to take their health seriously. One eminent consultant to industry has tabulated seven "danger signals" of approaching heart trouble which deserve the attention of every business man: (1) a tendency to start putting on weight; (2) losing sleep because of business worries; (3) growing apprehensive; (4) developing a dislike for responsibility; (5) finding the heart beating faster as job pressure rises; (6) becoming reluctant to accept promotions; (7) needing a drink or two to "get homework done." One obvious answer, from the corporate standpoint, is a system of regular medical examinations for executives — at least as good as those furnished as a fringe benefit to employees, or by some unions to their members.

—From The Biddle Survey (Biddle Purchasing Company, New York) May 1, 1956, reproduced in *The Management Review*, October, 1956.

The Evaluation of Biomydrin Nasal Spray in an Industrial Clinic

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IN AN EFFORT to reduce time lost due to colds we encourage our employees to seek nursing care at our dispensary at the first signs of an upper respiratory infection. The nurses are trained to give advice concerning proper hygiene and measures which might help reduce secondary complications and time lost. These patients, unless the occasion demands, are not physician treated, but receive from the nurses sufficient antihistaminic tablets for two days and a nasal decongestant for symptomatic relief. Although we have employed this routine for over two years, the effect on absenteeism from colds has not been impressive.

During the winter of 1954 to 1955 we became interested in a nasal spray containing two antibiotics, an antihistaminic, a wetting agent and a decongestant (Biomydrin®) which had been reported[1-6] to be safe and free of rebound congestion. It was also reported that in a large series of cases, it provided potent antibacterial and decongestive action as well as relief of allergic symptoms in nasal conditions of an allergic or infectious origin.

In 84 cases, a preliminary comparative study between this antibiotic nasal solution and a plain decongestant was carried out (the same antihistamine was administered to both groups). The results indicated that:

1. The antibiotic solution was effective in producing symptomatic and objective improvement in three and six days;

2. The antibiotic solution greatly reduced the number of leucocytes in the nasal smear;

3. A greater number of patients receiving the antibiotic solution were completely free of symptoms after four days, than were those receiving the decongestant only.

Although these results were found to be statistically significant we felt a double blind study would not only help to corroborate these findings but also might yield further information concerning the therapeutic action of this medication without any possible effect of bias. This report covers our findings in a series of 145 additional patients.

Biomydrin® Nepera.

Method of Study

EVERY patient included in this study received a sufficient number of 50 mg tablets of thonzylamine hydrochloride (Neohetramine®) to cover two days therapy. (However, every patient received nasal spray medication, every alternate got the nasal decongestant naphazoline hydrochloride in a 15 cc spray bottle labeled A and every other patient received the Biomydrin, labeled B and bottled in an identical spray bottle.) Neither the physicians nor the nurses knew which solutions were dispensed until the study was completed. All the patients were examined carefully at their first visit to the clinic. If their colds had existed less than 24 hours, the cases were included in this study. In addition to the usual personal data, a careful record was made of the subjective symptoms, objective findings on nose and throat examination, temperature and other pertinent findings. A sample of nasal secretion was taken for smear study. An oral temperature of 100° F eliminated the patient from the study.

After the above information was recorded the nose was packed with either of the solutions. The patients were then instructed to spray both nostrils four times a day with the spray medication given them, which was the solution used for packing in each instance. The patients were examined by one of the three authors in all cases at the start of the therapy and on the third and seventh day of therapy. At each visit careful note was made concerning subjective symptoms, results of nose and throat examination, and repeat samples were taken for nasal smear examination. A record was made to show whether the patient was worse, the same, improved, or cured. Days to complete disappearance of symptoms and any time lost due to the cold were recorded.

Results

A TOTAL of 145 patients were treated and included in the study, 78 of whom received the Biomydrin and 67 the nasal decongestant. The two groups were analyzed as to age and sex and found to be similar.

Neohetramine® Nepera.

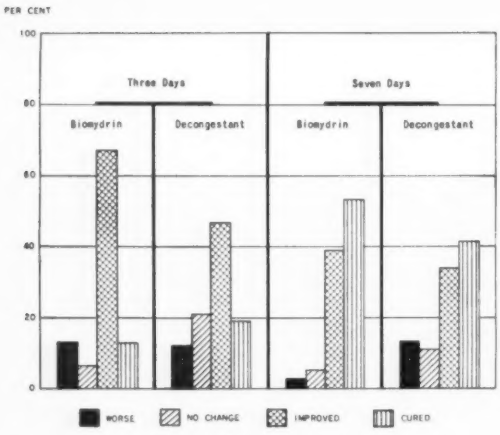

Fig. 1.

Comparison of the percentage subjectively improved plus cured shows the biomydrin to be more effective with statistical significance at the 10% level after three days and at the 2% level after seven days.

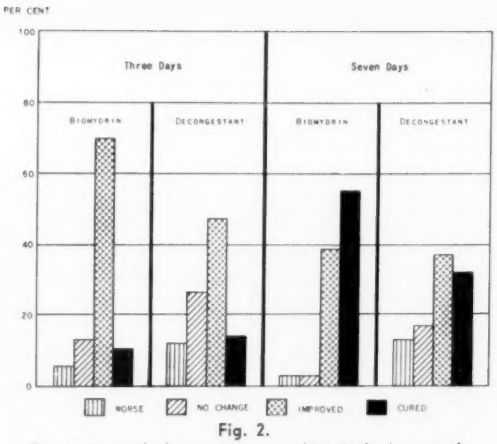

Fig. 2.

Comparison of the percentage objectively improved or cured shows the biomydrin to be more effective, with statistical significance at the 2% level after three days and at the 0.1% level after seven days.

A. Subjective Improvement:

The difference in effect on subjective symptoms between the two agents is demonstrated in Fig. 1. At the end of three days of treatment, the antibiotic nasal spray produced improvement or cure of cold symptoms in a greater percentage of patients than did the decongestant. At the end of seven days a far greater number of patients were free of symptoms or markedly improved, as a result of having used the antibiotic spray rather than the plain solution.

Most uncomplicated colds sometimes last as long as seven days, yet 24.5% of the patients using the nasal decongestant reported that there had been an increase or no change in the severity of their subjective symptoms. With the antibiotic solution, however, only 8.4% reported no change or an increase in the severity of their cold symptoms. The subjective improvement reported by the group receiving the antibiotic spray included such changes as less nasal congestion, less discharge, a more watery secretion rather than a thick purulent one, less coughing, less malaise, and in general a greater feeling of well being than that reported by those employing the decongestant alone.

B. Objective Improvement:

Many times a patient's report of his subjective symptoms is colored by his attitude towards his job and his desire to take a few days off. In many instances the severity of his complaints is not necessarily a true reflection of the clinical condition. For this reason, an examination of the nose and throat of each patient was made at every visit so as to compare objective changes with the subjective symptoms. The results are recorded in Fig. 2 which shows that by the third day of treatment all but 19.4% of the Biomydrin group had shown definite improvement in the appearance of the nose and throat membranes, and that by the seventh day all but 5.6% had shown improvement. With the nasal decongestant visual proof of effective therapy was not as evident, as 38.6% failed to show improvements in three days and 30.2% had no change at the end of seven days therapy. The evaluations of results on a symptomatic and objective basis parallel each other closely in both groups.

C. Nasal Smear Examination:

As an added means of comparing the therapeutic actions of the two nasal solutions, gram stain preparations of the nasal secretions were examined microscopically in all cases. The absence of eosinophiles indicated that we were treating primarily colds of a non-allergic nature. In the Biomydrin group, eight cases showed eosinophilia at the beginning of treatment which disappeared by the seventh day. Of the nasal decongestant group, there were five with eosinophilia at the beginning of therapy. They were still present in the same quantity at the seventh day of therapy.

The effects of the two drugs on the leucocytes are shown in Fig. 3. The three-day effects of the two drugs were approximately the same, however, the effects differed quite markedly by the seventh day of treatment. By that time, 14.5% of the smears of the Biomydrin group, had no white cells and 46.5% had only a rare cell. This corresponds to the 35.6% of the patients who were considered cured in seven days on objective examination. The 16.2% who had still a great number of white cells in the nasal smear can be compared to the 13.2% who were worse on objective examination at the end of this period.

In the group treated with the decongestant alone, secondary infection was more prevalent, as shown by the number of patients who had large numbers of leucocytes in the nasal smear. The smears of a majority of the patients, 54.2%,

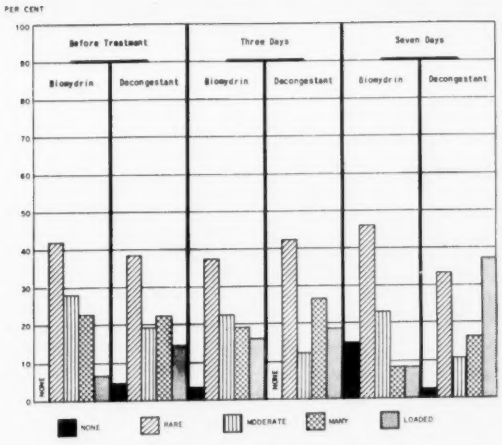

Fig. 3.

Nasal smears for leucocytes. Comparing the weighted means of the leucocyte counts, there were no differences between the drug groups even after three days. After seven days, the leucocyte smears were significantly lower in the biomydrin than in the phenylephrine group at the .1% level, resulting from a significant drop in the former (at the 1% level) and a moderate rise in the latter (at the 5% level).

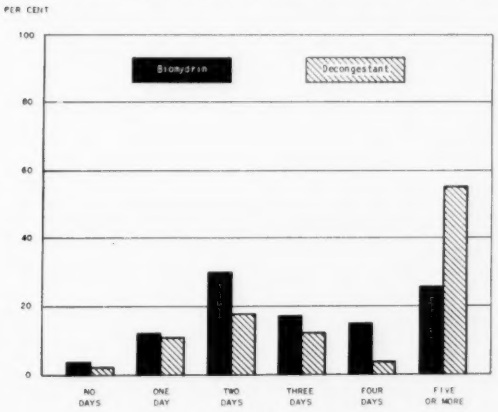

Fig. 4.

Days to disappearance of symptoms. Comparison of groups shows biomydrin to be statistically lower at the 1% level both in mean number of days and percent with symptoms persisting for five or more days.

showed either "many" or "loaded" with leucocytes as compared to 12.5% in the antibiotics nasal solution group.

D. Days Lost Because of Colds:

We kept a close record of days lost because we had hoped that the use of the antibiotic nasal solution would decrease the severity of secondary infection and result in less absenteeism. The motivation of staying home varies with each individual and therefore absenteeism cannot be taken as an indication of the severity of an individual's illness. Although the mean time lost was greater in the decongestant group, statistically, we observed no significant difference in time lost between the two groups.

E. Days to Disappearance of Symptoms:

From Fig. 4, it is seen that a group receiving the antibiotic nasal solution responded promptly to medication, 75% of the patients by the fifth day were completely free of symptoms. On the other hand the decongestant alone produced complete disappearance of symptoms in only 45% of the cases in that time. This, of course, is an indication that the antibiotic solution is a factor in keeping the patient more comfortable at his job.

Comment

THE USE of topical antibiotics for nasal application has been widely discussed, with no agreement as to the exact value of such medication. There is no doubt that if an adequate concentration of active ingredients can reach the site of infection, the value of nasal antibiotic solutions can be enhanced. The literature[1-6] indicated that Biomydrin, the antibiotic nasal solution studied, contains a wetting agent with mucolytic properties which acts to disperse mucus so as to enable the active ingredients to reach the site of infection. In addition this antibiotic solution contains two antibiotics, neomycin and gramicidin, which are not ordinarily used systemically.

The nasal decongestant did not appear to prevent the development of purulent discharge, whereas there was a greater tendency for the secretions to remain watery following the use of the antibiotic nasal spray. The absence of leucocytes after one week of therapy in many slides of nasal secretions, indicated that this solution possessed antibiotic activity. In the few cases where eosinophiles were present, the antihistamine in the solution produced antiallergic effects. However, it is in the prevention of secondary infection that an antibiotic nasal solution is a more advantageous product than a decongestant alone.

Summary

A SERIES of 229 patients over two cold seasons were treated and examined to determine whether topical antibiotic therapy was of value in the treatment of colds. When compared to a nasal decongestant, the antibiotic solution definitely shortens the duration of symptoms, provides prompter symptomatic relief and objective improvement, and, as shown by examination of the nasal smear, tends to protect against development of secondary infection. We have adopted Biomydrin for routine use in our dispensary.

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Problems of Industrial Deafness

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INDUSTRIAL physicians more and more are assuming essential roles in the field of industrial deafness. The many singular problems attending this type of deafness, and its cause, have focused attention upon the need for industrial physicians as well as otologists with training and experience in this field, since they are being called upon with increasing frequency to diagnose individual cases, and to advise management on the development of adequate hearing testing programs.

While some physicians are trained in clinical audiometry, they may not be equally familiar with the unusual problems found in industrial hearing testing and noise measurement. The need for this type of specialized training among industrial physicians and others with interest in the field has become generally recognized, and several institutions are now offering this type of instruction.

Four years ago Colby College, in Waterville, Maine, incorporated in its Summer Graduate Program a course in the problems of industrial deafness. The course of one week's duration is planned to provide an opportunity for physicians and others to obtain a realistic and positive perspective of these problems and to receive practical instruction in how to initiate and conduct conservation of hearing programs in industry. This course is given annually and is open to industrial physicians, otologists, safety engineers, hygienists, nurses, lawyers, technicians, and representatives of labor and management. The response during the past four years has been so enthusiastic that a syllabus of the course is here presented in order to provide industrial physicians with a perspective of important information if they are associated with a noisy industry.

The material in the course is necessarily basic and presented with the assumption that none of the participants has had previous experience in the field. During the week of the course all students and most faculty members live in the dormitories of Colby College. These arrangements permit the participants to have many informal sessions where specific industrial problems can be easily discussed and clarified. Lectures are also informal with ample time allowed for discussion and pertinent questions.

A description of the substance of the 16 lectures and sessions follows:

1. *Orientation: Physiology and Functional Anatomy:*

The manner in which the ear functions . . . . Anatomy in the cochlea emphasized . . . . The role of the middle ear and eustachian tube . . . . Clarification of transmissions of sound energy by bone conduction so that limitations of ear protectors as attenuators may be better appreciated.

2. *Over-all Problems of Industrial Deafness:*

Why conservation of hearing in industry is an important problem from the medical as well as the medicolegal viewpoint . . . . How roughly to determine if a plant has a noise problem . . . . How to obtain a noise survey . . . . How to obtain audiometric tests on employees . . . . Who are the industrial personnel responsible for correlating the noise and hearing surveys . . . . How to determine if a noise is hazardous to hearing . . . . What preventive measures need be taken . . . . The economics of an industrial conservation of hearing program . . . . Industrial relations and educational procedures necessary in such a program.

3. *Physics of Sound:*

Elementary physics of sound as applied to the measurement of noise and hearing. . . . The nature of sound, how it reaches the ear. . . . Frequency characteristics of the ear. . . . Ultrasonics . . . . How speed of sound is affected by various media . . . . Pure tones . . . . Frequency and intensity . . . . Octaves . . . . Wave length . . . Standing wave . . . . Measuring sound intensity . . . . Microbar . . . . Sensitivity range of the ear for intensity . . . . The decibel and its logarithmic character . . . . Reference levels for noise measurement and hearing loss . . . . Reason for using the decibel scale . . . . How to interpret decibel changes . . . . Examples of common noisy occupations in terms of decibels above acoustic zero.

4. *Psycho-Acoustics:*

The field of psycho-acoustics as it concerns hearing testing and the evaluation of results of noise and hearing surveys . . . .Clarification of

such terms as pitch, frequency, loudness, and intensity . . . . The phenomenon of hearing . . . . The difficulties involved in measuring hearing . . . . The importance of a response mechanism in hearing testing . . . . Types of responses . . . . Disadvantages in industrial situations . . . . What is threshold . . . . The type of threshold obtained in industrial hearing tests . . . . How it differs from research testing . . . . The reference level or average normal hearing on the audiometer . . . . How this is obtained . . . . What the audiometer measures . . . . What it does not measure . . . . The limitations of threshold testing in interpretations of audiograms . . . . Speech hearing tests . . . . Threshold for speech . . . . Discrimination testing above threshold . . . . Relation of speech and hearing noise . . . . The psychological effects of intense noise . . . . Effect of noise on efficiency, performance, and the human body . . . . Auditory fatigue and its relation to permanent deafness . . . . Status of susceptibility tests for deafness . . . . Ambient noise and the effect of masking in hearing testing.

5. *Seminar:*

Movies are shown that demonstrate the function of the middle and inner ear, the fundamentals of the physics of sound, the damaging effects of industrial deafness, the elements of noise control and methods of auditory rehabilitation. This session is an evening meeting with opportunity provided for questions and discussion.

6. *Measurement of Hearing Loss:*

Why conversational and whispered voice tests do not meet needs of industrial testing . . . . Techniques and limitations of screening tests Self-recording audiometry and objective audiometry . . . . Description of technique for puretone individual audiometry in industrial situations . . . . Who should do audiometry . . . . How to select a room for audiometric testing . . . . How to furnish a test room . . . . What is an audiometer . . . . How should one be selected . . . . Calibration of an audiometer . . . . Importance of valid and reliable audiograms . . . . The importance of the initial audiogram . . . . Instructions to the subject prior to performing an audiogram . . . . How the subject should be seated . . . . How to perform a routine audiogram . . . . How to expedite testing in certain situations . . . . How to record an audiogram with serial forms for industrial purposes . . . . What a tester should tell the subject . . . . Review of the common errors of audiometry.

7. *Audiometry Laboratory:*

Under the critical eye of instructors the students practice performing audiometric tests on subjects, using various types of standard audiometers. At the end of each laboratory session instructors emphasize the errors most commonly made and re-state the reasons for requiring uniform procedures in audiometric testing. By using different types of commercially available audiometers the students can determine which is most suitable for their particular needs. Caution is taken that instructors do not influence students by their own preferences. Throughout the period of the course the audiometers remain available for further use by the students who may wish or need further practice in performing hearing testing. This applies particularly to those, such as industrial nurses, who may be assigned to perform the actual audiometry in their plants.

8. *Sound Levels; Frequency Analysis:*

All commonly used equipment for making noise measurements is demonstrated and explained. Each student is supervised as he makes noise level measurements and frequency analysis of an intense steady-state noise recorded on tape. Instruction is given in how to care for the equipment, how to calibrate it, what to do if it needs repair, what equipment costs, how to make sound level measurements of steady-state noise and what additional measures are needed for impact noise, how to determine if measurements are reliable, how to hold and use the microphone and how to correct for extension cables, how to test for microphonics and vibrations, how to make frequency analyses in octave bands and how to check reliability of results in each band with the over-all level, where to make measurements in various types of plants, how to determine sources of error, how to record noise measurements and how to analyze data obtained.

9. *Malingering:*

The types of malingering encountered . . . . Reasons for malingering . . . . Methods of detection . . . . What tester should do when he suspects malingering . . . . Description of the manner by which the otologist establishes a reliable threshold for malingering subjects . . . . How to reduce the incidence of malingering in conservation of hearing programs.

10. *Records:*

Data that must be obtained and recorded during hearing testing program . . . . Otological examination and history . . . . Data to be recorded on audiogram, such as subject's duration of exposure to noise, period of rest prior to audiogram, etc. . . . . Various methods of keeping records for industrial and research purposes.

11. *Acoustics, Ear Protectors, Etc.:*

Acoustics and noise control . . . . Damage risk criteria . . . . Suggestions for evaluating noises in plants represented by students . . . . Recording and plotting a noise survey . . . . Demonstration of types of commercially available ear protectors . . . . Advantages and disadvantages . . . . Suggested educational program in preparing plant employees for hearing testing program . . . . How to indoctrinate employees in the use of ear protectors . . . . How to adapt a room for industrial

hearing testing . . . . Commercially available testing booths . . . . Ventilation problems . . . . Brief description of bandwidths and masking.

12. *Field Work:*

Students visit a noisy plant and conduct a hearing and noise survey. Through the plant's safety engineer, with whom arrangements have been made in advance, employees are available for hearing testing and test rooms set up with audiometers. Two plants are available for this practical work. At each plant half the student group is assigned under instructors to perform the noise survey while the other half does hearing testing. Each student has the opportunity to perform and record a complete noise survey under instruction, evaluate the suitability of the test room, calibrate the audiometer, and test a representative number of employees who have recently been exposed to the intense noise being measured. Data collected are analyzed at a seminar later in the day at the college.

13. *Medicolegal Panel:*

Formal presentation of medicolegal aspects of industrial deafness by experienced attorney or other qualified individual . . . . Panel discussion follows in which all students and faculty members participate, with all important and pertinent phases of this matter discussed: compensation law, development of interest and legislation in key states, correlating pure-tone hearing loss and hearing handicap for speech, what industries can do to obviate unjust medicolegal entanglements resulting from industrial deafness, how to prepare records for legal purposes, etc.

14. *Interpretation of Audiograms; Pathology of Hearing:*

Responsibility for interpreting audiograms and making diagnosis exclusively that of the otologist . . . . Pitfalls in making diagnosis solely on basis of an audiogram . . . . Nature of the examination the otologist needs to make in order to reach a valid diagnosis . . . . Understanding the otologist's report . . . . Description of various types of hearing disorders and how closely some of them resemble industrial deafness in the audiometric picture . . . . How noise produces deafness . . . . Difficulties of bone conduction testing . . . . Value of speech hearing tests to determine handicapping nature of loss . . . . Recruitment and its clinical effects . . . . Psychological effects of hearing loss, with particular emphasis on industrial deafness . . . . How to make management aware of these factors . . . . Auditory rehabilitation and value of hearing aids in certain types of deafness . . . . Responsibilities of an otologist as a consultant to an industry with noise problems.

15. *Establishing a Conservation of Hearing Program:*

How to determine if a noise is causing deafness in exposed personnel . . . . Who should perform the noise measurement . . . . How to evaluate results of the noise survey and institute a hearing testing program . . . . How to train a tester to obtain reliable audiograms . . . . The responsibilities of the safety engineer, the hygienist, the industrial physician . . . . Responsibilities of management and labor in the over-all program . . . . How often to repeat routine audiograms . . . . The criteria for hiring new employees in specific noisy industries . . . . Criteria for referring employees with hearing loss to otologists . . . . How to integrate into a "team" those persons who are vital to a successful conservation of hearing program.

16. *Review:*

Each faculty member sums up his foregoing lectures in order that the students may be left with an integrated concept of a proper conservation of hearing program and with full awareness of how they can initiate and conduct such a program in their own industries.

During the period the course is given, pertinent reprints from the literature and bibliographic material are made available to the students. The keystone of the entire program is the faculty, who present the information in such a manner that it is readily absorbed, understood, and retained even by students who have had no previous experience in any phase of industrial deafness. The gracious hospitality of Colby College and the recreational facilities made available create an excellent atmosphere for the concentrated program in the problems of industrial deafness.

The above syllabus is presented to serve as a topical guide for those who wish to be oriented and trained in the expanding field of industrial deafness. Physicians who may wish to increase their knowledge in this area and who may be unable to attend any such course will find the material described in articles which will be presently available in the literature or in books soon to be published.

Wine Break

INSTEAD of a coffee break, employees of Spanish wineries producing sherry are given time off every 40 minutes to refresh themselves with a glass of wine.

—*The Central Reminder*, published by Central Photo Engraving Company, Chicago.

Proposed Occupational Health Program for Employees of the City of Columbus

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IN AUGUST, 1955, a request came to the Department of Preventive Medicine of Ohio State University for aid in determining the occupational health needs of the 3300 employees of the City of Columbus. A major problem was a skyrocketing workmen's compensation rate, considered to be due in part to a nearly total lack of medical guidance.

From a study of the municipal organization, of physical requirements, and of specific job hazards, a detailed proposal for establishing a prevention-centered employee health program was prepared for presentation to the Mayor and his Council. From the proposal, which appears below, an emergency ordinance was prepared and passed into law in December, 1955.

On January 1, 1956, the Columbus Employee Health Service opened its doors under the part-time direction of a member of the Department of Preventive Medicine who was appointed Acting Chief Physician to serve until a full-time director could be recruited. As facilities were increased and nursing staff trained, services were quickly made available. Beginning in February, a thorough preplacement physical examination for every job applicant was provided.

On June 1, 1956, Dr. Frank Herrington of Columbus was appointed full-time Chief Physician. By that time, there were three additional part-time physicians, three nurses, and a secretarial staff. Full services were then available. Six months later, the program was thriving, supported enthusiastically by the city administration and employees alike.

This communication is submitted because of the reported rarity of sound occupational health programs within public service organizations, especially at the municipal level. The City Attorney was unable to find an example of a similar ordinance in effect in any other large city.

It has often been asked whether political pressures significantly affect such a program. We are happy to report that this has not been a problem in this instance.

A major handicap has been the disgracefully low salary range possible for the medical staff. This had to be set within an existing civil service structure, as described in the proposal. Such low rewards for professional services tend to discourage the establishment and development of sound programs of this kind. Although close relations do exist between the Employee Health Service and the teaching activities of the Department of Preventive Medicine, there seems to be little justification for such an unrealistic scale of compensation. We are confident that this problem can be solved as the value of the services proves itself.

Background

A. ORGANIZATIONAL INFORMATION:

The City of Columbus is one of the major employers of the community. There are some 3300 workers in 40 divisions. Occupations range from the specialized and hazardous duty of police and fire officers to clerical and supervisory duties. There are large numbers of laboring jobs such as street construction and repair, refuse disposal, and vehicle maintenance.

The Mayor is the chief administrative officer of the local government organization. Responsible to the Office of the Mayor are the chief department heads such as Director of Public Safety, Director of Public Utilities, Director of Public Service, and Commissioner of Health. Division superintendents are directly responsible to departmental directors. Also responsible to the Mayor are several special boards, one of which is the Board of Industrial Relations staffed by a Safety Coordinator, now Mr. J. E. Pagnard. This Board has three members representing, respectively, the Health Department, the Legal Department, and the Service Department. The Commissioner of Health is Chairman of the Board.

B. THE DEPARTMENT OF INDUSTRIAL RELATIONS:

A Board of Industrial Relations was established by city ordinance in 1932. In 1942, another ordinance created the Department of Industrial Relations and established certain duties to be carried out under the supervision of the Board. In 1950 the Department of Industrial Relations

was reorganized and charged by Council with the following duties:

1. To inaugurate and conduct a policy of job safety education for city employees.
2. To investigate occupational injuries and diseases among city employees.
3. To expedite the processing of workers' compensation claims.
4. To reduce the cost of the state industrial premium and other costs arising out of occupational injury and illness.
5. To discuss with the Board of Industrial Relations methods for the advancement of the Municipal Safety Program.

The present Safety Coordinator was selected on the basis of his ability to conduct an industrial safety program, and he has received specialized training in this field at National Safety Council headquarters in Chicago.

A sound municipal safety program has been organized as directed by City Council, and within the strict budgetary limits imposed. Accident frequency rates, however, although reduced somewhat from previous high levels, continue to be in excess of those reasonably expected to occur in this kind of an employed group. In addition, the state industrial premium has continued to increase sharply every year since 1948. This has been due largely to a failure to provide:

1. Adequate medical advice in the course of the hiring procedure.
2. Adequate medical supervision of injured persons by city physicians.
3. Medical control of work absences from all health causes.

The need for these measures was recognized early by the safety coordinator, who has continued to press for them.

C. EXISTING MEDICAL SERVICES:

The principal medical services presently available are those in the Department of Public Safety, applicable chiefly to the Divisions of Fire and Police. Two part-time physicians and one full-time nurse are employed to conduct this medical program. It consists of pre-employment physical examination of applicants for police and fire duty, emergency first aid service for illness and injury to department personnel and to prisoners, and a limited-type periodic health appraisal available to firemen and policemen. This periodic check-up consists of blood pressure, basal metabolic test, chest x-ray, and electrocardiogram, all performed by the nurse. The two physicians are employed by the Director of Public Safety and are directly responsible to him. They are assisted by part-time senior medical students who serve in the city prison dispensary as externs. Except for emergencies, there is available only about one hour daily of physician's time for routine employee and prisoner health matters.

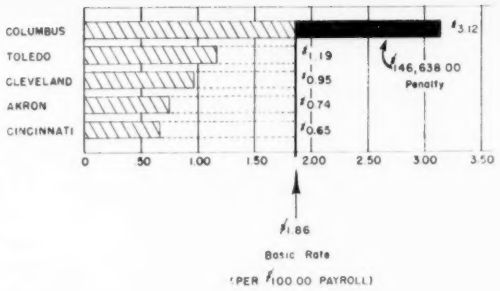

Fig. 1.
Compensation premium rates, 1954.

There is a central dispensary on the fourth floor of the city prison, consisting of one examining room and combined nurse's station and waiting room. There are two treatment rooms, one for male city prison inmates and personnel, and a second for female city prison and workhouse inmates. There is an electrocardiograph, a basal metabolism unit, a small x-ray unit, and some limited laboratory facilities.

A second type of medical arrangement exists in the Department of Health whose employees are subject to a limited type of pre-employment physical examination and to periodic x-ray of the chest. These services are performed by physicians in the Health Department and are under the supervision of the Commissioner of Health.

D. HEALTH AND SAFETY EXPERIENCE:

1. The state industrial premium rate has increased steadily from a figure of $68,548.00 in 1948 to $363,105.00 in 1954. The total premium charge to the City of Columbus for the five-year period, 1948 to 1952 inclusive, was $606,009.00. This is by far the highest premium rate paid by any city in the state, as illustrated by comparative figures as follows:

WORKMEN'S COMPENSATION RATES PAID BY OHIO CITIES IN 1954

City	Risk Rate (per $100.00 of payroll)
Cincinnati	$0.65
Akron	0.74
Cleveland	0.95
Toledo	1.19
COLUMBUS	3.12

(Current basic rate, Ohio municipalities—$1.86)

2. The partial cost of sick leave for city employees in 1954 was $190,287.26 or approximately 1.5% of total payroll. This is the amount actually paid out in sick leave benefits, but it is believed that a substantial amount in addition was paid by some divisions and reported as vacation leave.

3. The over-all accident frequency rate for the first six months of 1955 was 33.36 for all city divisions. The highest rates occurred in street construction and repair, street cleaning, garbage and refuse disposal, and garage service. The average

frequency rate for all industrial organizations who reported their experience to the National Safety Council in 1954 was 7.22 (7.22 disabling injuries per million man hours worked — Fig. 2). The Columbus rate is nearly five times this figure, and is much higher than that of other cities in the state.

4. The rate of absenteeism is thought to be very high although reliable figures on its incidence are not regularly compiled. The rate of labor turnover in laboring jobs also is very high, but no exact figures are available.

E. PRESENT HEALTH AND SAFETY POLICIES: There is no over-all medical policy relating to city employees. Provisions for occupational health services for fire and police departments are carried only in departmental regulations.

There is no over-all city employee safety policy statement although some departmental regulations carry items that have been recommended by the Safety Coordinator.

F. ACTIVITIES OF THE INDUSTRIAL NURSE EMPLOYED IN THE INDUSTRIAL RELATIONS DEPARTMENT:

A nurse was employed for two years to assist in carrying out the city safety program. On September 1, 1955, she was transferred to the Health Department payroll as a Public Health Nurse with full-time duty in the Health Building. Previous to that, she was available to all divisions for professional assistance in the event of occupational injury. She assisted in the compilation of records of occupational injury. In addition to these duties in the Industrial Relations Department, she also worked two full days each week in the Food Handler's Clinic in the City Health Department, and was available to the fire and police medical service for relief of their full-time nurse. While she did conduct a highly successful program of visual screening of all city employees, using the Ortho-Rater, there were relatively few opportunities of this sort for her to exercise professional training and skill in the practice of preventive measures related to the health and safety of city employees. Seasoned medical opinion and guidance in these matters was not available to her.

Over-all Appraisal of the Employee Health and Safety Service

A. THE PRESENT program is considered to be substandard in the following respects:

1. In the municipal plan of organization there is no clearcut over-all responsibility for employee health and safety.

2. There is no established medical policy provided for the guidance of all professional and supervisory personnel.

3. The total time now available from the two part-time physicians is inadequate to provide the professional services necessary for an effective employee health program.

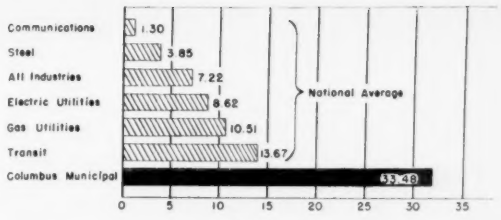

Fig. 2.
Injury frequency rate, 1954. Disabling injuries per 1,000,000 man hours reported to National Safety Council.

4. There is no central adequately equipped medical dispensary to care for the occupational conditions of all employees of the city and to conduct necessary placement and periodic physical examinations, although floor space for this purpose is available in the new Health Center.

5. There is no routine preplacement physical examination of all job applicants.

6. There is no provision either for the periodic health appraisal of employees engaged in hazardous work operations (except fire and police), or for informed health counseling relating to the job.

7. There is no strict and continuing medical supervision of first aid care on the job and the transportation of injured employees, or follow-up.

8. There is no source of informed medical opinion for the appraisal of the return to work recommendations of private practitioners of medicine in the community, many of whom are not familiar with specific job requirements in the city organization.

9. There is no manual of procedure for the guidance of nurses and externs in the care of emergency medical problems in the absence of a physician.

10. There is no participation by medical personnel in the appraisal of applications for extended sick leave.

11. There is no integrated program of regular job inspection from the point of view of industrial hygiene hazards.

12. Existing medical records are completely inadequate as a source of useful information on the health status of city employees.

13. Present expenditures for employee health service, based on an estimate of the cost of operation of the police and fire program, amounts to approximately $22,000 per annum, or less than $8.00 per city employee per year; this is between one-third and one-half of the cost of a sound employee health program for an employed group of this type and size, based upon the experience of

private industry and governmental organizations.

B. The caliber of existing health services is low, because of the fact that there is insufficient physician time available for the conduct of a sound program. This represents a waste of a considerable portion of the present investment in facilities and equipment, since these are not utilized to the fullest extent possible. In addition much greater dividends would be expected from the work of presently employed medical personnel if their work were implemented and guided by the services of a physician specially trained and experienced in employee health problems.

Presently Accepted Standards for a Sound Employee Health Program

CERTAIN standards of organization, function and performance have been derived from the long term experience of numerous industries and government agencies, and are applicable to any employed group (Appendix "A"). These standards actually constitute a sound statement of basic employee medical policy. Detailed regulations for the implementation of such a medical policy are derived from these standards.

Details of a Proposed Employee Health Program for the City of Columbus

AN ADEQUATE health program for all employees of the City of Columbus should be developed, coverage to include hourly, clerical, and supervisory workers of all divisions, including police and fire. The headquarters and major facilities are to be located in the Health Building, with accessory medical facilities as presently established.

MEDICAL ASPECTS OF THE PROGRAM:

1. Routine preplacement (on employment and transfer) physical examinations of all job applicants, with recommendations for proper placement based upon comparison of the physical and emotional abilities of the candidate with the actual demands of the job.

2. Interval physical check-up on: (a) Employees returning to work after sick leave. (b) Alleged permanent disability due to injury. (c) Employees exposed to toxic materials. (d) Accident repeaters. (e) Supervisory personnel (voluntary), police and fire personnel (compulsory), and on others at their request and within the limits of available facilities. (f) Drivers of city vehicles (compulsory).

3. Emergency first aid care of: (a) Work injuries, with continuing review of treatment and progress until complete recovery; referral of problem cases to specialists. (b) Symptoms of non-occupational illness or injury, with immediate referral to the private physician for definitive care. (c) Illnesses occurring in city prisoners.

4. Maintenance of a complete system of individual records on all employees in the Medical Department, and periodic reports to higher authority of health progress.

5. Frequent routine job inspections, in cooperation with the Safety Coordinator, for the purpose of identifying hazardous conditions of a toxic nature.

6. Health education and health counseling of employees within the limits of available facilities.

7. Review of problem cases of extended sick leave or prolonged absence following injury on the job.

8. Analysis of physical demands of all jobs, for the purpose of effecting sound placement of job applicants and transfers based upon physical abilities.

9. Preparation of a statement of medical policy, a manual of Medical Department procedures, and written standing orders (as required by law) for the guidance of nurses and externs in the absence of a physician.

IMPLEMENTATION OF THE HEALTH PROGRAM:

*1. Physical facilities presently available: (a) Approximately 700 sq. ft. of space in the new Health Building. (b) Approximately 450 sq. ft. of space at City Prison.

**2. Equipment and supplies presently available: (a) Basic diagnostic tools such as blood pressure apparatus, stethoscopes, ophthalmoscope, etc. (b) Diathermy. (c) Examining tables. (d) Ortho-Rater for vision testing. (e) Electrocardiograph. (f) Spirometer (basal metabolism ma-

*Estimated cost of leasing if not available — $3750.00 per annum.

**Estimated purchase price if not available — $7500.00.

BUDGET—MEDICAL SECTION

Salaries:			
Chief Physician, full-time (Medical Services Chief, C Grade)	@ $779.00/mo	$9348.00	
*City Physicians (2) half-time (Public Health Physician, D Grade)	@ 707.00/mo	8484.00	
*Nurses (2)	@ 291.00/mo	6984.00	
Nurse-Technician	@ 278.00/mo	3336.00	
Laboratory Aide	@ 278.00/mo	3336.00	
Stenographer	@ 252.00/mo	3012.00	
*Externs	@ 360.00/mo	4320.00	
**Medical Supplies*:	@ 200.00/mo	2400.00	
**Office Supplies*:	@ 30.00/mo	360.00	
**Maintenance of Equipment*:		200.00	
Total (fixed costs)		$41,780.00	$41,780.00
*Less portions of items presently in budget			22,376.00
Balance (new expense)			$19,404.00
An initial outlay for new equipment as follows may be anticipated:			
Medical equipment		$2000.00	
Office equipment		1800.00	
Industrial hygiene instruments		500.00	
Automobile		1600.00	
Total (capital expenditure)		$5900.00	5,900.00
Grand Total			$25,304.00

NOTE: See Job Descriptions, Appendices B, C and D.

chine). (g) X-ray, fluoroscope, and dark room. (h) First aid instruments. (i) Major laboratory equipment, such as microscope, and blood serology testing equipment. (j) Sterilizing equipment. (k) Linen. (l) Office furniture and equipment.

3. Additional equipment and supplies required: (a) Additional basic diagnostic tools. (b) First aid instruments and supplies. (c) Basic industrial hygiene instruments for the detection of dangerous dusts and fumes. (d) Medical record forms and office supplies. (e) Office equipment. (f) Transportation for visits to job sites and hospitals and for use in medical emergencies.

Cost Versus Returns

THE GRAND total of new expense plus the cost of equipment is $25,304.00. An initial appropriation of $50,000.00 would be sufficient to launch this program. This is approximately $25,000.00 added to the present figure of $22,376.00 currently expended, but to poor advantage.

A potential saving of over $285,000 per annum (Cincinnati experience) in state compensation premium is the prize to be expected from a sound and well integrated program. The penalty payment alone in 1954 was approximately $147,000. No other major Ohio municipality was charged with a penalty last year. Improved experience would result not only in removing this penalty, but of reducing the premium further as a merit rating would be gained.

At the present time a considerable portion of the annual premium goes into the Industrial Commission's reserve fund, earmarked to provide coverage for injury cases that are likely to result in the payment of compensation over long periods of time. These are principally back cases, and they are occurring in increasing numbers. Even higher total premium rates are expected to be charged to the City unless this trend can be reversed. The only hope of control is a sound medical program.

Under the terms of House Bill 642, effective September 27, 1955, the employer is granted considerable relief in the compensation of injured persons who were previously handicapped by any one of a long list of conditions including heart disease, diabetes and arthritis. But in order to qualify for this relief, there must be prior knowledge of the medical condition of each employee gained through thorough physical examination. Only a medical program such as that proposed here will enable the City to take advantage of the benefits due to it under the new law.

Private employers have found that they cannot afford to be without adequate medical control of these problems. The City should recognize that much of the tremendous loss currently suffered in excessive compensation premiums would be recoverable under the proposed City Employee Health Program.

Appendix "A"
Standards of Organization, Function and Performance for Employee Health Services

I. THERE IS an organized Medical Department with competent medical staff including consultants. It has policies, procedures and facilities for adequate emergency dispensary and hospital needs, and the personnel to assure efficient care of the ill and injured.

II. Facilities are available for the performance of competent preplacement and voluntary periodic medical examinations in keeping with existing needs of the organization.

III. A system of accurate and complete medical records is maintained. Such records include a report of injury or illness, description of physical findings by the physician or nurse, treatment, estimated period of disability and end results, as well as other information pertinent to the case, as required by statute for workmen's compensation claims or other purposes. All medical records are regarded as confidential material, filed under medical supervision, and maintained only in the Medical Department.

IV. The Medical Department has general supervision over sanitation and industrial hygiene having to do with the health and medical welfare of all employees.

Appendix "B"
Chief Physician

QUALIFICATIONS, ATTRIBUTES, AND JOB DESCRIPTION:

1. Education: Graduate of an accredited Medical School and licensed to practice medicine and surgery in the State of Ohio. Should have graduate work in Industrial Medicine or equivalent in Industrial Medical practice.

2. Experience: Should possess a substantial medical background growing out of experience in Industrial Medicine and Surgery as contrasted with other types of specialization. Should be experienced in handling people and affairs. Must have sufficient experience with employee health practices to comprehend the significance of City Employee Health and Safety Policy, and be willing and able to apply this policy through cooperation, coordination and perseverance. Should have a minimum of five years' experience in Industrial or Preventive Medicine on a full-time or part-time basis.

3. Supplementary Knowledge: Must possess a knowledge and understanding of the legal implications and the practical working of the Workmen's Compensation Law of Ohio.

4. Abilities: (a) Administrative and leadership

Appendix "A" abstracted from the Standards adopted by the INDUSTRIAL MEDICAL ASSOCIATION and the Occupational Health Institute, Inc., 1955.

ability. (b) Ability to stimulate staff. (c) Ability to stimulate the interest and cooperation of City employees in their health program.

5. Professional: Must possess professional qualifications that command the respect of medical colleagues and the community at large. Should be an active member of or eligible for membership in the Columbus Academy of Medicine, the Ohio State Medical Association, the American Medical Association; should be an active participant in the affairs of the special professional societies devoted to Occupational Medicine. Should be competent to make a contribution to the professional field of Occupational Medicine through the presentation of results of the development of the City Employee Health Program, including contributions to staff development through the media of training, association, and conference. Should have an appointment to the attending staff of at least one major Columbus hospital.

6. Personal: Must possess a personality which stimulates confidence among fellow executives and supervisors in the City government, and commands the respect and support of these and all employees.

7. Job Description: The Chief Physician will develop, administer and coordinate the medical aspects of the City Employee Health and Safety Program; supervise medical nursing, technical and clerical personnel of the Medical Section; be responsible for all medical equipment and supplies; advise with essential supporting data as to the development and administration of City medical policies and standards, modification of existing policies, standards and procedures; conduct, and supervise other City Physicians in the conduct of, preplacement physical examinations of job applicants and job transfers, periodic health appraisals of personnel as indicated, minor medical and surgical treatments for occupational injuries and illnesses, return to work examinations, health education and counseling, and referral of employees to private physicians for the care of non-occupational conditions; report periodically on employee health progress to the Board of Industrial Relations, and, on request, to the City Council; develop health education programs designed to instill health consciousness in employees and supervisors; promote and coordinate executive and supervisor health examination programs; collaborate in the establishment of physical and mental requirements of jobs, in the investigation and determination of health hazards which may be involved, and the development of physical standards generally; collaborate and cooperate with the Safety Section and other responsible units in an effort to eliminate unhealthful working conditions and practices; designate professional personnel for special consultations as required; cooperate, as desirable, with Ohio State University College of Medicine in the education and training of medical students and graduate physicians in Occupational Medicine; cooperate with the Safety Coordinator in the development of job safety programs, safe working conditions, and protection against fatigue, exhaustion, excessive exposure to heat, and other health hazards; cooperate with the Personnel Department in the development of placement and transfer policies applicable where employment changes may be desirable because of physical or health conditions; establish and administer rules and procedures controlling the conduct of City Employee Health installations, including facilities for diagnosis and treatment; develop procedures for the first aid care and transportation of injured employees; and develop follow-up medical and nursing procedures for injured employees in hospital, in their homes, and in preparation for return to work; develop a reliable and confidential system of medical records, consistent with adequate medical standards and appropriate economy; periodically inspect City employee health facilities to assure proper medical, surgical, hygiene, and ethical services; review and advise concerning the appropriation of funds for the conduct of the City Employee Health Service; advise City Government Management Personnel concerning public relations of the employee health program; participate, as desirable, in regional and national meetings of medical and safety groups; maintain interest in and appropriate relations with recognized established agencies such as the American Red Cross.

Appendix "C"
City Physician

JOB DESCRIPTION:

1. Conduct preplacement physical examinations on job applicants.

2. Conduct periodic health examinations of employees according to policy as established by the Chief Physician.

3. Conduct return-to-work physical examinations and such other examinations as requested within the limits of the Health and Safety Policy Statement.

4. Provide minor medical and surgical treatment for employees injured or ill on the job.

5. Provide minor medical and surgical treatment for City prisoners.

6. Provide training and continued guidance to medical externs in the first aid treatment of employees and City prisoners presented during the externs' duty hours.

7. Respond to calls to major fires and to police situations requiring medical assistance.

8. Participate in health counseling and health education of employees.

9. Participate in Department of Industrial Relations staff conferences.

10. Consult with City management and supervisory personnel, at reasonable request, on individual employee health and safety problems.

Appendix "D"
Occupational Health Nurse

JOB DESCRIPTION:

1. Give emergency care for occupational injuries as authorized by written standing orders signed by the Chief Physician.

2. Give treatment for occupational injuries and illnesses under the supervision of the Chief Physician or other City Physicians.

3. Give emergency care for non-occupational illnesses or injuries for the purpose of aiding employees temporarily, helping them to finish out the work shift when this is desirable, and referring them to their private physician for further treatment if necessary.

4. Maintain a clean, smooth-running, and efficient employee health service unit.

5. Keep currently informed about the job requirements, the materials handled, and the maintenance operations of the service units of the City government.

6. Participate in and assist physicians in preplacement periodic and return-to-work medical examinations of employees.

7. Participate in the employees' health and safety educational program.

8. Assist with sanitation and industrial hygiene matters.

9. Participate in employee welfare activities.

10. Maintain, in confidential files, employee health records and medical section reports.

11. Keep abreast of developments in Municipal Government operations, in industry, and in her profession through: (a) Active membership in professional and civic organizations. (b) Reading of professional and safety periodicals. (c) Participation in nursing study groups as desirable.

12. Arrange and participate in daily sick call for City prisoners.

Utopia?

THE Profit Sharing Plan of the Lincoln Electric Company in Cleveland has attracted a great deal of attention. Strange to say, it hasn't produced many imitators, because "the results of the plan have been monotonously startling. Gross compensation per employee has averaged as high as $9,000.00 in a year for largely unskilled labor." The quotation is from a review by John Rhodes which has been appearing serially in the "Bulletin" of the New York Personnel Management Association. To continue, "Remuneration has always been at least twice the national average, often more. There is no union, since it is hard to conjecture what a union could do for them that they haven't been able to do for themselves under a plan which lets them run the plant practically as they please. There are no strikes, turnover is a rare phenomenon, with a hopelessly long list of applications from people who want to work there. Lest you think that the money for all this comes from high prices, consider this: Since the plan was installed production has increased over seven times, take home pay four times, dividends thrice, earned surplus twice, and prices have been cut in two. The public is not suffering. The productivity per man makes most of industry look pretty silly. Most important is the spirit of cooperation and unanimity which pervades the plant. There are few grievances because no one seems to have the time or the reason for them." Mr. Rhodes goes on to deal with the conclusions that may be drawn from this plan and from others of a similar kind. He points out that it isn't important that you adopt one of these particular plans but rather to design one yourself. The principles that he would like to have you embody in your plan are those of participation and cooperation. If the opportunity is made so that people can participate and cooperate greatly, almost any mountain can be moved.

—From an Editorial in *Personnel Journal*, September, 1956.

Migraine and the Industrial Physician

A Review of the Syndrome and Report of the Successful Management of the Problem in an Industrial Facility

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THE PROBLEM of treating patients suffering from recurring headaches is commonly encountered in almost every type of medical practice — otolaryngology, ophthalmology, internal medicine, neurology, general practice, and industrial medicine. The type of headache suffered by the particular patient, whether it be vascular in nature or arising as a result of other stimuli, and the frequency and severity of the headache attacks determine the extent to which the headache problem will incapacitate the patient. It is because of this incapacitating factor that the headache problem represents an item of extreme socio-economic importance. This is seen economically by the fact that headache is a reason frequently given for absenteeism at work. Headache is also a factor which will universally tend to lower the individual's efficiency while he is working.[1] Therefore, the headache problem is one of major importance to the physician engaged in industrial practice. This problem is further complicated by the fact that there exists a great number of types of headaches with an equally great number of causes.

It is the purpose of this report to demonstrate that the successful treatment of the most commonly encountered headaches, those of vascular origin, is within the scope of industrial practice. The selection of proper therapy is dependent upon an accurate diagnosis, and this may be facilitated by differentiation of the characteristics which identify various headaches.[2]

Authorities are in agreement that the headaches most commonly encountered by the physician are of the vascular type, that is, those having to do with some impairment of normal cerebral vessel tone. Headaches of this type are unamenable to treatment with simple analgesics or analgesic-sedative combinations, for these do not act specifically against the cause of the often incapacitating head pain. Migraine is the most common type of vascular headache known. Reports on the incidence of migraine vary,[3] but it is believed that 8-12% of all patients seen in general practice suffer from migraine,[2] and that 10% of the population of the United States is afflicted with the disease. Little has been reported on the incidence of migraine among industrial workers, but it may be said that the figure is lower here than it is in workers whose positions are clerical, professional, or executive in type. However, when expressed numerically rather than percentagewise, this figure will become significant. A study into the amount of work hours lost or impaired as a result of migraine headaches is worthy of initiation.

The patient with "classic" migraine suffers an average of 10 attacks per year, attacks which, when left untreated, have an average duration of from 24 to 48 hours. Friedman[4] has stated that migraine is a symptom-complex, the outstanding features of which are periodic, unilateral, throbbing headaches of great intensity. These periodic, violent headaches are suffered by people who are otherwise healthy. Their background is one of physical well-being. The headache is the most prominent symptom of the migraine attack, but it is often preceded by unique visual and/or gastrointestinal phenomena ("Aura"). Next in line of prominent symptoms in the typical migraine attack is the severe nausea and vomiting which accompany the head pain ("sick headache"). Also, as a result of tensing the skeletal muscles of the head and neck in an effort to relieve the head pain of vascular origin, the migraine patient unwittingly causes an irritation of the muscles in the occipital area of the neck and head. This tenderness often lingers on for hours after the vascular head pain has ceased (residual pain). Therefore, although the entire syndrome is usually referred to as "migraine headache," it consists also of severe nausea and vomiting, and residual pain in the occipital area.

Unfortunately, even though migraine has been a problem disease for more than 5000 years, little is known as yet regarding its specific etiology. Only in the last two decades have Wolff[13] and his associates performed most of the monumental work upon which the present day theory of the mechanism of a migraine attack is based.

To date, there is no cure for migraine. However, for symptomatic pharmacotherapy, there

is now available a drug which treats effectively each of the features of the migraine syndrome heretofore described.

Etiology

ALTHOUGH migraine has been termed the theorist's happy hunting ground,[5] certain facts which do have etiological significance may be gathered from the literature. Females are more prone to develop migraine than males. Case histories will usually reveal that the first migraine attack was suffered prior to the onset of puberty. One investigator recently indicted migraine as the etiology of recurrent abdominal symptoms and headaches in children.[6]

As with many other diseases, migraine has run the gamut of etiological theories. A possible relationship between migraine and allergy has been given thorough study and consideration by many investigators.[1,4,7,8] However, from the studies which have been conducted, it may be concluded that migraine is probably only rarely of allergic origin.[7] It is suggested that ingestion of chocolate, citrus fruits, and alcohol be restricted, since these agents may precipitate a migraine attack. Since migraine is often associated with changes in the hormonal balance of the body (puberty, menstruation, menopause), the theory of endocrine imbalance has been investigated.[9] However, endocrine therapy in the treatment of migraine has proved disappointing. It is not uncommon for females to suffer migraine attacks during the menstrual period,[10] and to experience remission of attacks during pregnancy. Such etiological theories as vitamin and dietary deficiencies, metabolic disturbances, body fluid imbalance, and neurosympathetic disturbances remain in need of significant, substantiating evidence.

Heredity has remained a significant etiological factor throughout all studies of migraine patients. Careful case history-taking will usually reveal a family history of migraine in a large percentage of patients. Graham[5] has stated that this factor is so strong that the lack of a family history of migraine should give one considerable cause for hesitation in making the diagnosis.

Symptomatology—Mechanism of a Migraine Attack

IT IS BELIEVED that changes in the tone of certain cerebral vessels produce the well-known symptoms of the "classic" migraine attack. Through the pre-headache occurrence of certain subjective phenomena (aura), the migrainous individual is forewarned of an impending attack. This early warning phase is known generally as the prodromal period, and consists physiologically of vasoconstriction of certain intracranial branches of the internal carotid artery. Among the subjective phenomena which have been reported by patients as having occurred during this vasoconstriction or prodromal period are scintillating scotomas, photophobia, zig-zag lines in front of the eyes ("fortification spectra"), hemianopsia, paresthesias, vertigo, speech disorders, and hyperhidrosis. It should be noted here that this phase of a migraine attack is usually brief; oft times it passes so quickly that the patient has difficulty in recalling it. Detailed case history taking, however, will usually reveal the occurrences of these pre-headache phenomena, however brief they may have been. Graham[5] has stated that repeated occurrences of this type in persons in whom no organic cause may be demonstrated, supply sufficient evidence to make the diagnosis of migraine. Since pain does not occur during this phase of an attack, the patient is able to tolerate these phenomena adequately.

This prodromal period is followed by sudden "explosive" dilatation and distention of cranial arteries, primarily in the distribution of the external carotid artery. Accompanying this dilatation and distention is an increased amplitude of pulsation of these affected branches of the external carotid artery. This increased amplitude of pulsation stimulates the pain-sensitive nerve structures surrounding the dilated and distended vessels and is presumed to cause the violent, unilateral headache, the outstanding feature of the migraine syndrome. Corresponding to the increased amplitude of pulsation, the pain is of a throbbing, pulsating nature in this stage of an attack.[1] Any movement which increases the distention of the affected cranial vessels increases the intensity of the pain. Often accompanying this severe, throbbing head pain is severe nausea and vomiting (particularly in "classic" migraine), and often complete prostration. This clinical picture—violent, unilateral, throbbing headache and severe nausea and vomiting—marks the height of the attack, which many times terminates after the nausea and vomiting subside.

Sustained dilatation and distention of the affected cranial vessels results in engorgement and thickening of the walls of these vessels, and they eventually become pipe-like and rigid. Edema ininside and outside the walls of the affected cranial vessels serves to intensify the severity of the headache.[11] The pain in this stage becomes a steady, severe ache, replacing the earlier pulsating type of pain. It must be borne in mind that throughout the migraine headache attack, the patient is continually tensing the skeletal muscles of his head and neck in an effort to obtain relief from the head pain. This action brings about a muscle contraction pain in the occipital region of the head and neck. This pain usually resides after the cerebral vascular changes have reverted to normal. Thus it can be seen from the description of the mechanism of a migraine attack that the migraine syndrome is composed of three outstanding features—the head pain of vascular origin, the severe nausea and vomiting, and the

residual pain in the occipital area. Each of these must be taken into consideration from a pharmacotherapeutic standpoint.

Diagnosis

IN MAKING the diagnosis of migraine, again the importance of a complete clinical history cannot be overemphasized. The classification of the type of headache that is present in an individual case is based upon the site and source of the pain, the frequency and duration of the attacks, and the nature of any associated manifestations. According to Friedman,[4] one or more of the following factors should be present in order for the diagnosis of migraine to be made:

1. Recurrent, severe headaches, usually throbbing and unilateral in onset, occurring against a background of relative well-being.

2. Transient visual disorders preceding the actual headache, such as scintillating scotomas, photophobia, "fortification spectra," hemianopsia and blurred vision. There may be less frequent symptoms such as paresthesias, speech disorders, vertigo, sweating or other vasomotor disorders.

3. Nausea and vomiting occurring at the height of the attack and often terminating the attack. ("Sick headache" is a true characteristic of migraine.)

4. Family history of migraine in a large percentage of the cases.

5. Relief by ergotamine derivatives in about 85% of the cases.[4] For this reason, ergotamine-containing preparations may often be administered diagnostically,[10] after ruling out contraindications, since headaches of vascular origin respond to ergotamine tartrate.

Laboratory examinations do not reveal any signs which might be of positive diagnostic value. Many times these laboratory examinations are required for their psychological effect in obviating any patient thoughts of insanity, cerebral tumors, or carcinoma.

Characteristics of Migraine Worker

RYAN[1] has aptly described the typical migraine patient-worker: "As a rule the migraine patient has a superiority complex. They are of a most ambitious, meticulous, hard-working class to whom no task is insurmountable; they pay strict attention to every minute detail of their appointed tasks. These people, even when experiencing the severe pain of their attacks, will try to carry out their usual daily work with the same detail and perfection that they exhibit when free from headache. This quite often requires superhuman efforts and energy, and in many cases it is almost impossible to do this. Unfortunately, the average migraine patient is not situated so that he can forego his day's work in order to effect an early termination of the attack or a reduction in the severity of the symptoms of the attack. Therefore, the patient becomes a slave to the circumstances and starts his daily toil with a resolve to 'do or die.' Being in a dull mental condition and in a physical weary condition that is almost insurmountable, this carrying on of daily chores is next to impossible. After he has passed through the automatic motions of doing his 'daily dozen,' he returns to his home as a perfect wreck, physically and mentally, and goes to bed exhausted completely."[1] Thus the degree of impairment of efficiency of the migrainous worker may be readily seen and appreciated, and the problem of relieving his periodic affliction magnified.

Therapy

PHARMACOTHERAPY aimed at the prevention of migraine attacks has been unsuccessful. In line with the many theories which have been advanced regarding its etiology, such drugs as ACTH, sex hormones, sedatives, tranquilizers, hypotensives, antihistamines, and vitamins have been employed in vain in the hope of treating or preventing attacks. Analgesics are of course ineffective, owing to the nature of the headache. To date, migraine is best treated by a combination of psychotherapy and symptomatic pharmacotherapy. The physician in industrial practice should sympathetically aid the patient to understand the problem with which he must live, and should stress the importance of adjustment to this problem.

Symptomatic pharmacotherapy has been markedly successful in the management of an actual migraine attack. The migraine patient who takes his medication in time and in adequate dosage will usually experience complete relief from the attack. *The optimal time of administration of medication is during the prodromal period when the occurrence of the unique visual or gastrointestinal phenomena forewarn of an impending attack. Further, medication must be taken in adequate dosage if complete relief is to be obtained.* Many times failure to obtain complete relief may be attributed to too little medication taken too late in the attack.

Regarding therapeutic agents, ergotamine tartrate has long been recognized as the most effective drug with which to abort migraine and other vascular headaches. It was, in fact, the first drug to offer any real help in the treatment of migraine. The vasoconstricting action of ergotamine tartrate is most effective when the drug is administered as early as possible in the migraine attack, before the vessels have become indurated. However, in practice, when the available ergotamine tartrate tablet is given, it does not act quickly enough to abort an attack of migraine, and the physician must often administer the drug parenterally. Until recently, a combination of ergotamine tartrate and caffeine was the most widely employed in the treatment of migraine.

Caffeine was combined with ergotamine tartrate to enhance the efficiency of the former. Since the action of the combination remains that of vasoconstriction, it treats only the vascular head pain portion of the migraine syndrome. Many patients complain that this combination induces nausea and vomiting, when in reality the nausea and vomiting are inherent in the migraine attack itself, and occur because this combination does not act to abort the attack quickly enough. This has often necessitated the prescribing of an antispasmodic to quiet gastric smooth muscle spasms and to permit absorption of the ergotamine to take place. Further, the available ergotamine tartrate-caffeine combination requires approximately 30 minutes to disintegrate in human gastric juice,[10] often times allowing the cerebral vascular changes to reach the point where they become unamenable to pharmacotherapy.

A preparation recently made available* is unique in that it supplies in a quick-disintegrating tablet ergotamine tartrate and caffeine to abort vascular head pain, belladonna alkaloids to alleviate nausea and vomiting, and acetophenetidin to relieve the residual muscle contraction pain in the occipital area. Outstanding results achieved through use of this preparation in treating migraine patients in private practice have been reported by the author elsewhere.[12] The following report illustrates the usefulness of this new preparation in industrial practice.

Study

THE AUTHOR is consulting physician to a lace factory located in Bronx, New York. This organization employs over 425 adults, of whom 175 are female. The work done by these women requires skill, dexterity, and extreme meticulousness. Medical facilities consist of a fairly well-equipped first aid room and dispensary, and a registered nurse on full-time duty. Each month for the past two years, an average of five females, known migraine patients, have visited the nurse's office suffering from migraine attacks. On each occasion, the nurse administered ergotamine tartrate parenterally and sent the patient home. Four months ago, this modified ergotamine preparation was introduced in the dispensary, and all personnel who had formerly received parenteral ergotamine tartrate were instructed to report to the nurse's office at the first sign of a migraine attack. All of these patients were informed of the importance of taking early medication for their attacks, and of the successful treatment of other migraine patients by this therapy. During the next four months, 27 migrainous women were treated. After taking an initial dosage of two tablets, each patient was allowed to rest in the dispensary for about one hour. Each was then able to return to work, with but the one hour lost from the job. Since the initiation of this therapy, no parenteral ergotamine tartrate has been administered.

*Wigraine,® Organon Inc., Orange, N. J.

Summary

1. BECAUSE of its estimated incidence in the general population, migraine presents as great a problem to the industrial practitioner as it does to the physician engaged in any other medical specialty.

2. The specific etiology of migraine remains unknown.

3. Changes in the cerebral vascular system contributing to the symptomatology of the migraine attack are reviewed and discussed.

4. A minor case study is presented illustrating the effectiveness of a new therapy in the on-the-job treatment of migraine in industrial workers.

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Fatten Upon Worries

WORRY apparently makes the girth grow greater. Businessmen who find that their waistlines have been expanding while their business problems have become more cramping may draw a few crumbs of comfort from the findings of a survey of the eating habits of "top-level executives" at a London luncheon club. "Big-city businessmen," it sums up — and the emphasis here seems to be on the "big" — "have been eating more . . . . the consequence presumably of longer hours, harder work, and increased worry." The Walbrook River Club lays the blame squarely on the "tight money" and its attendant problems, and quotes the psychologists' findings that people eat more during certain "anxiety states." —From *The Chicago Sun-Times*, November 7, 1956.

Biological Effects of Atomic Radiation

Report to the Public by the
National Research Council, Washington, D.C.

IT IS generally agreed that, in the peacetime development of atomic energy, man has been lucky. He has been dealing with an enormous new force whose potential effects he has only dimly understood. Thus far, except for some tragic accidents affecting small numbers of people, the biological damage from peacetime activities (including the testing of atomic weapons) has been essentially negligible. Furthermore, it appears that radiation problems, if they are met intelligently and vigilantly, need not stand in the way of the large-scale development of atomic energy. The continuing need for intelligence and vigilance cannot be too strongly emphasized, however.

The problems of radiation fall naturally into two main classes: (1) the effects on human beings; (2) the various ways in which radiation can reach human beings through the environment.

Effects on Humans

THE inheritance mechanism is by far the most sensitive to radiation of any biological system.

Any radiation which reaches the reproductive cells causes mutations (changes in the material governing heredity) that are passed on to succeeding generations.

Human gene mutations which produce observable effects are believed to be universally harmful.

Everyone is subjected to the natural background radiation which causes an unavoidable quantity of so-called spontaneous mutations. Anything that adds radiation to this naturally occurring background rate causes further mutations, and is genetically harmful.

There is no minimum amount of radiation which must be exceeded before mutations occur. Any amount, however small, that reaches the reproductive cells can cause a correspondingly small number of mutations. The more radiation, the more mutations.

The harm is cumulative. The genetic damage done by radiation builds up as the radiation is received, and depends on the total accumulated gonad dose received by people from their own conception to the conception of their last child.

So far as individuals are concerned, not all mutant genes or combinations of mutant genes are equally harmful. A few may cause very serious handicaps, many others may produce much smaller harm, or even no apparent damage.

But from the point of view of the total and eventual damage to the entire population, every mutation causes roughly the same amount of harm. This is because mutant genes can only disappear when the inheritance line in which they are carried dies out. In cases of severe and obvious damage this may happen in the first generation; in other cases it may require hundreds of generations.

Thus, for the general population, and in the long run, a little radiation to a lot of people is as harmful as a lot of radiation to a few, since the total number of mutant genes can be the same in the two cases.

It is difficult to arrive at a figure showing how much genetic harm radiation can do. One measure is the amount of radiation, above the natural background, which would produce as many mutations again as occur spontaneously. It is estimated that this amount is 30 to 80 roentgens. (The roentgen is a unit of radiation. To give an idea of its value, the average dental x-ray delivers five roentgens to the patient's jaw, but only five-thousandths of a roentgen of stray radiation to more remote parts of the body such as the gonads.)

It is also estimated that a dose of 10 roentgens to every person in the United States would cause something on the order of five million mutant genes which would then be a part of the population's inheritance pool. This figure is subject to considerable uncertainty.

At present the U. S. population is exposed to radiation from (a) the natural background, (b) medical and dental x-rays, (c) fall-out from atomic weapons testing. The 30-year dose to the gonads received by the average person from each of these sources is estimated as follows:

(a) Background—about 4.3 roentgens.

(b) X-rays and fluoroscopy—about 3 roentgens.

This is Part II of "The Biological Effects of Atomic Radiation," A Report to the Public, from a Study by National Academy of Sciences — National Research Council. Copies of the full report are available without cost to all who request them. Address the Biological Effects of Atomic Radiation, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington 25, D.C.

(c) Weapons tests—if continued at the rate of the past five years would give a probable 30-year dose of about 0.1 roentgens. This figure may be off by a factor of five, i.e., the possible range is from 0.02 to 0.5 roentgens. If tests were conducted at the rate of the two most active years (1953 and 1955) the 30-year dose would be about twice as great as that just stated.

If the exposure of the general population to radiation is limited to levels which the genetics committee believes reasonable (see recommendations at the end of this part), there should be practically no pathological effects in the persons receiving the radiation.

Larger exposures (say 100 roentgens and up) of the whole body or a large part of it are generally harmful when received in a single dose. (Much higher doses may, however, be safely and usefully delivered to limited portions of the body under the controlled conditions of medical treatment.) Very little is now known about how to treat the pathological effects of radiation or how to protect the body against them in the first place. Much research is needed in these fields.

One of the effects is a shortening of life. This seems to involve some generalized action. Irradiated individuals may age faster than normally even if they do not develop specific radiation-induced diseases like leukemia. It has not been shown that exposures small enough to be genetically tolerable have this effect. Furthermore, the permissible exposure levels that have been established for persons working with radiation appear to be within the limits of safety. However, it is not yet known what minimum dose, if any, would be necessary to produce a statistically noticeable reduction of life span when very large numbers of people are concerned.

Environment and Food Supply

RADIATION in the general environment has not yet become a serious problem. In a few decades, however, radioactive waste products from atomic power plants will represent an enormous potential source of contamination. How much of this radioactivity will actually reach the population depends on how successfully it can be kept out of the great network—ocean and air currents, food and water supplies—which connect man to his surroundings.

At present test explosions of atomic weapons are the only significant source of radiation in the general environment, above the natural background.

Meteorologists have found no evidence that atomic explosions have changed the weather or climate. Nor do they believe that continued weapons tests, at the same rate and in the same areas as in the past, would have such an effect.

Radiation from explosions passes into the atmosphere and much of it eventually returns to the ground as "fall-out."

Fall-out divides into three classes: (1) close-in—material that comes down within a few hundred miles of the explosion, and within 10 to 20 hours, (2) intermediate—material that descends in a few weeks after the explosion, (3) delayed—material that remains in the air for months or years.

Close-in fall-out from test explosions affects only restricted, uninhabited regions.

Intermediate fall-out would descend very slowly if it were pulled down only by gravity. It is mostly washed out of the air by rain and snow. It spreads over large parts of the earth, but its effect over a small area may be accentuated if there is heavy precipitation while the radioactive cloud is overhead.

Delayed fall-out is stored for long periods in the stratosphere. Meteorologists know very little about the interchange of air between the stratosphere and lower layers, so they cannot predict exactly how long the material will stay up, or where it is likely to descend.

At this point the oceans are not receiving any significant quantities of radioactive material. But eventually they will undoubtedly be used as a repository for some of the radioactive waste products of atomic power plants.

Before this can safely begin on a large scale, much research is needed to determine the mixing rates between various parts of the seas. Materials deposited in some of the deep parts of the ocean may remain there 100 years or more, so that most of their radioactivity would be gone before they reach surface water. On the other hand, material dumped into coastal and other surface waters would directly affect marine life and, within a few years, would contaminate all parts of the world because of the relatively rapid circulation of surface layers.

Radioactive tracers can be used to chart ocean and air currents and to study the interrelationships of marine animals. Many important experiments in these fields will be possible only within the next 10 or 20 years. Increasing radioactive contamination of the sea and atmosphere will make it impossible after that to detect the tracers against the heightened background.

Radiation from fall-out inevitably contaminates man's food supply. Radioactive elements in the soil are taken up and concentrated by plants. The plants may be eaten by humans, or by animals which in turn serve as human food.

At present the contamination is negligible, but the maximum tolerable level is not known. There is not nearly enough information about the long-term biological effects on man or animals from eating radiation-contaminated food. Research in this area is urgently needed.

Probably the most important potential food contaminant is strontium 90—a radioactive element that concentrates in bone tissue. Already, detectable although biologically insignificant traces of it have turned up in milk supplies thousands of miles from the site of atomic explosions.

Food from the oceans is also subject to radioactive contamination. Marine plants and animals extract and concentrate various radioactive elements that get into sea water. The concentration is cumulative, increasing as it proceeds up the chain from microscopic plankton to edible fish.

Properly used, radiation can enhance man's food supply rather than damage it. Radiation techniques have already opened important new fields in agricultural research and will undoubtedly become increasingly valuable. No drastic change in agricultural production appears imminent, however.

Tracer studies will help us understand basic metabolic processes in plants and animals. They will also be applied to practical problems such as the use of fertilizers.

Mutation rates in plants are being artificially speeded up with radiation in the hope of producing new and superior strains. Thus far, only a few new economic varieties have been found, but the method is promising. The use of radiation to sterilize packaged food may have dramatic impact on food technology by reducing the need for refrigeration and extending the shelf-life of many products.

Holding radiation to a tolerable worldwide level will require adequate methods for disposing of, or, rather, for containing radioactive wastes from power reactors.

Some of these wastes will remain dangerously radioactive for centuries.

Research has indicated some apparently feasible systems for controlled disposal, but none is yet at the point of economic operating reality.

The major problem in routine disposal is what to do with the wastes resulting from the processing of reactor fuel. The wastes from normal operations of reactors themselves can be more easily handled.

A second major problem is to anticipate the accidents that will inevitably occur and to set up safety standards that will insure that they do not become catastrophes.

Considered in this light, it appears feasible to use nuclear reactors in central station power plants and in naval vessels.

Recommendations

IN THE light of these findings the study committees have made a number of recommendations. Those of the genetics committee apply most directly to all of us. They are:

1. Records should be kept for every individual, showing his total accumulated lifetime exposure to radiation.
2. The medical use of x-rays should be reduced as much as is consistent with medical necessity.
3. The average exposure of the population's reproductive cells to radiation above the natural background should be limited to 10 roentgens from conception to age 30.
4. The 10-roentgen limit should be reconsidered periodically with a view to keeping the reproductive cell exposure at the lowest practicable level.
5. Individual persons should not receive a total accumulated dose to the reproductive cells of more than 50 roentgens up to age 30 years, and not more than 50 roentgens additional up to age 40. (About half of all U. S. children are born to parents under 30, nine-tenths to parents under 40.)

Other recommendations of general interest:

6. Techniques for monitoring worldwide fallout should be further improved.
7. Measurements of the storage of radiation in the stratosphere should be continued and extended.
8. A national agency should control and keep records of all dumping of radioactive material in the ocean.
9. An international body should set up safe standards for the marine and air disposal of radioactive materials as soon as possible, based on current knowledge.
10. Research in marine disposal should be carried out on a cooperative international basis.
11. Until advances in reactor technology substantially reduce potential hazards, buildings that house reactors located near populated areas should be sealed against the release of radioactive materials in the event of accident.
12. Research should be continued and accelerated, particularly in the fields of: fundamental genetics, mammalian genetics, human and population genetics: pathological effects of radiation; mixing between various parts of the atmosphere; mixing between various parts of the oceans; the role of plants and animals, both on land and in the oceans, in concentrating radioactive materials; the tolerable levels of radioactivity in human and animal food; geophysical and geochemical aspects of the ultimate disposal of radioactive wastes; selection of biologically suitable sites for various atomic facilities; and safety devices for the control of accidental power surges in reactors.

Industrial Health in India

From the Annual Report of Tata Industries, Limited

H. P. DASTUR
Chief Industrial Health Officer

THAT "Health is Wealth" is nowhere more true than in industry. There are many in industry who are not in full health. Most of them have little idea of their disability as they somehow go through their daily chores. Besides, the cause of their ill-health is often as subtle as it is complex. It may be physical, mental, or social in nature, or a puzzling combination of all the above factors. Not to solve the puzzle is to let loose tensions which may breed discontent, misunderstandings, disputes, and lowered production. To tackle it is to enter an obstacle race.

In the first place there are the difficulties of unravelling the true cause, as the prominent symptoms are often a face-saving device to hide the true cause. For one reason or another a worker may dislike his boss. But he dare not stop work on that ground and justify the stoppage to his boss, his wife, or his friends. It is here that his subconscious instincts of self-preservation, self-respect, and so on, come to the rescue to produce functional symptoms like backache or headache, or plausible excuses for aggressive attitudes or even organic disease like peptic ulcer. One must bear in mind that society considers all these conditions good in law for stoppage of work or its neglect.

Then there is the ironic side to the above situation. The doctor instead of easing it can complicate it. When he does not understand such a situation, his instincts, like his patient's, play monkey tricks with him. The diagnosis is difficult. To admit it may prove still more difficult. An easy escape is to brand the patient as a malingerer. This makes him worse.

Even when the doctor arrives at the correct diagnosis he has to use tact to convince the patient of the true cause of his illness. Society shows full sympathy for all bodily ailment, but as it generally looks askance at any trouble related with the mind, the patient resents being connected with any such trouble, though he often readily believes that his co-worker, his subordinate or his chief (especially if he be one with whom he cannot get on) may be in such a state of mind.

Yet another problem is the worker climbing up the managerial ladder. The higher he climbs, his actions affect—for good or ill according to the state of his health—a larger number of people. But when in the process of climbing up he feels so self-satisfied as to develop a halo round his ego it indeed becomes difficult to bring him to that awareness that with every rise in his grade he needs more health, and more tolerance for the other fellow's viewpoint through better control of his emotions.

"Industrial neuroses" is the technical name of troubles like the above, and their number is legion. There are more people in industry suffering from this than most people think. Ignorance of this fact raises honest doubts in the minds of a good many representatives of managements as to whether medicine can have any part to play in the production drive. "Produce or perish" was the slogan that prevailed in World War II, and medicine backed it whole-heartedly, for it gave medicine its chance to secure an honourable footing in industry. It is on the strength of its achievements in World War II that medicine advocates the same slogan as suitable to convert an elusive peace into a real one. Production is the goal—the main goal of industry—and rightly so. Naturally therefore industrial health service, to be acceptable to management, must develop a utility aspect besides the human. But as it happens the two aspects are the two sides of the same coin, and that is man. To respect human values is to help oneself, as well as be useful to others, and prove that 'people produce—not machines.'

TO GIVE an instance, an important factor that hinders production is employee absenteeism, both actual and invisible. The absence is invisible when an employee is present in person but not in terms of production. One of the aims of industrial medicine is to help the production drive by removing as many causes of absenteeism as possible.

India is fast industrialising, for increased production is the need of the hour. There is no lack of enthusiasm or talent, and money is being found; but the snag here is man with his many and changing moods. His mother-tongue is human values, while the language of industrial management is logic. Logic without human values makes so little sense to the industrial worker that he often holds up the best plans of efficiency engineers even though sound logic and good intentions may have gone into their framing. Researches, however, have been made, and many studies indicate that the worker readily responds to all projects which aim to increase his efficiency through work studies, wage systems, promotion schemes, merit-rating schemes, financial incentives, and so on, when those sponsoring such schemes take the trouble of considering the human aspects of such studies and schemes. Technology leads to management logics of policies, costs, meth-

ods, standards, controls. But the worker must understand the need to meet standards, the need to be cost-conscious, the need to be quality-conscious and safety conscious, and the need for cooperation. He can only do so when his sentiments, values and assumptions receive due consideration.

The major problem of industrial relations is with the minds of men. But body and mind are Siamese Twins. The behind-the-scene interplay between them is intimate. Moreover, both are acutely sensitive to their physical and social surroundings. Nor is that all. Man's many interests vary from time to time and place to place in rhythm with the changing environment, yet all of them have to be served if the target is his total health, and the target cannot be lowered if industry is to prosper.

Total health is a matter of teamwork of several sciences of man and matter. Accuracy is the hallmark of machines, whereas actions of human labour that work the machines are unpredictable. This need not lead to any difficulty in developing a social discipline for teamwork, for 'in the space-time world the subject matter of physics flows into the subject matter of chemistry into medicine into psychiatry into psychology into economics, by insensible gradations.' The Industrial Health Department of Tata Industries is aiming at such teamwork through its integrated program of medical aid, environmental hygiene, mental hygiene, welfare activities and research. And this is the annual report of such work done during the year 1955 in five Tata factories: Ahmedabad Advance Mills; Svadeshi Mills; Tata Mills; Tata Oil Mills, Sewri; and Tata Chemicals, Mithapur. Three of them are factories for cotton textiles, one for soap, and one for chemicals. The total clientele served comes to about 18,000, and the staff employed consists of nine doctors, seven safety engineers, and three training officers.

Medical

DURING the year under report 3302 received placement medical examinations. These include a few supervisors also, and the examination is slowly but surely gaining favor with them. What is still more important is the health of the senior executive. The only start so far made in this direction is medical examination of the senior executive returning to work after a serious and prolonged illness. Out of the above 3302 placement medical examinations, 577 were new employees among whom 14 were found unsuitable for their jobs . . . . As in the previous year visual defects and malnutrition predominate. Cases of low blood pressure (i.e., systolic 100 and less) are more common at Advance Mills. That is perhaps because the Advance Mills workers take little animal protein . . . . Doctors of the three Bombay factories have given special attention to visual defects. They have contacted a firm of opticians to obtain for workers easy terms for buying glasses. The management of the Svadeshi Mills have gone a bit further, and have made arrangements with this firm to pay their charges for glasses and recover the cost from the workers in easy installments. The next most alarming finding of the placement medical examinations is malnutrition. It is realized that to do any useful follow-up work on this score, it is necessary to undertake nutritional and also socio-economic surveys with a view to introduce family planning among workers. This is being implemented . . . . At the Tata Oil Mills 532 workers received periodic medical examinations. Such examinations can serve as a yardstick for measuring the progress of medical aid if they follow a standardized plan at all the factories. As no such standard has so far been worked out, it is decided to do so at the next refresher course . . . . There were four serious accidents in three months among 25 oilers of Advance Mills. Safety talks were given to them by the training officer and the safety engineer with the result that there have been no accidents for a long time since then. From the 3302 workers who received the placement medical examinations 39 were suspected as likely to be suffering from tuberculosis and were sent for a radiological examination; 16 of them were confirmed as tuberculosis cases. All arrested cases of tuberculosis on work receive a periodic three-monthly check-up and whenever necessary a further radiological test. Among family members of workers applying for aid, 14 cases were found suffering from T.B. of lungs and four from T.B. bones. We advise every case of tuberculosis we detect to get his contacts examined radiologically. Some do so . . . . The medical examinations revealed eight cases of leprosy, five among old operatives and three among new applicants. All of them were referred to the Acworth Leprosy Hospital. Two of the five old workers diagnosed as non-infectious were not removed from work. The remaining six were infectious, but after treatment two of the remaining three old operatives became non-infectious and were allowed to return to work . . . . The only cases of occupational diseases noticed during the year were 14 mild cases of actinic conjunctivitis (welders' eyes) and eight mild cases of dermatitis, two owing to handling of dyes, and six owing to turpentine. In the three textile mills one comes across several cases of chronic respiratory trouble which may or may not be occupational. Some research work was done on this and a paper submitted to the Industrial Health Advisory Committee of the Indian Council of Medical Research who after discussion decided that a similar study should be carried out at other textile centers in the country. This has started at Ahmedabad . . . . The natural result of the above activities is rehabilitation of the worker handicapped through illness or injury. Twenty-two such cases were rehabilitated into jobs suitable to their capacity; 18 out of them reverted to their old jobs after a period of about three to six months. One was rehabilitated on his own job by lessening his workload, while three were given permanent new jobs. An indication that the policy of rehabilitation is gaining ground is that it is being also extended to new recruits. Two blind men from the National Home for the Blind were found jobs suitable to their condition, and both are doing satisfactory work.

Industrial Medical Association

President's Page

ALMOST two-thirds of this term of office has passed. There have been many occurrences which have made holding the office of President a pleasure. There have been many meetings which have been quite instructive. The component societies, which I have visited, are doing an excellent job. The committee reports at our October directors' meeting showed earnest, sincere work. Most of the committees have had one or more meetings and subjects which formerly seemed to be problems are being resolved by their efforts. For this fine work, the officers and I extend our thanks.

The counselors have shown enthusiasm for the great amount of work which was put on their shoulders, and the way they have carried it without a murmur assures me of a fine future for IMA. It was most gratifying to have almost a complete attendance of the directorate at our October meeting, and to see the earnestness and intelligence with which they disposed of business.

Because of our Managing Director and Executive Secretary, the past few months have gone quickly and pleasantly for me. I am sorry that each and every one of the membership cannot have the same opportunity of working with them, that I have been fortunate enough to have. I really need not mention the *Journal* and its staff, because everyone knows it is the outstanding journal on Industrial Medicine in the country.

The St. Louis Conference committee under the leadership of DR. SHILLING, has the April meeting very well planned. I am amazed and thrilled with the extensive amount of work which has already been done, and I can safely say that anyone who misses the annual meeting in April will have passed up a grand opportunity for education in Industrial Medicine as well as much good fellowship.

I am quite sure the next few months will seem quite short and as pleasant as the past. For all of this I thank the entire organization and wish you all a Merry, Merry Christmas and a Happy New Year.

E. S Jones M.D

Books

Best Bargain

PESTICIDE HANDBOOK, 8th Edition: D. E. H. FREAR. College Science Publishers, State College, Pennsylvania, 1956, pp. 208, $1.25 paper bound; $3.00 cloth bound.

Few industrial physicians may pass any quarter of the year without some situation imposed by the toxicity or potential toxicity of insecticides, fungicides, herbicides, rodenticides, or soil conditioners. The busy consultant in occupational health scarcely may hope to watch a week elapse without being confronted by these chemicals. The outstanding difficulty usually is that only the trade name is available without any inkling as to the true constituency. Right there is where this book proves its worth. Some 6,111 agents are listed by trade name, then by chemical constitution, and then by manufacturer. Thus, at random, item 4740, "Quicksan" turns out to be 10% phenyl mercuric acetate, a fungicide manufactured by Stecker, which producer's address later appears.

As to money, this book is the best bargain of the publisher's wares. Price $1.25 (paper bound).

All Three Are Good

INDUSTRIAL MEDICINE AND HYGIENE: Edited by E. R. A. MEREWETHER. F. A. Davis Company, Philadelphia, Volume 1, 1954, pp. 426; Volume 2, 1954, pp. 451; Volume 3, 1956, pp. 617.

This is the American publication of a three-volume system on occupational health, first published in the British Empire by Butterworth & Co., Ltd. Lord Horder, who wrote the foreword, hits the nail squarely when he characterizes this book as one for the occupational health team. He adds, "An intensified public conscience concerning the health, safety and welfare of the worker in his daily environment, together with the manifold achievements of industrial research in the last decade, have greatly stimulated the work of those who make this branch of medicine their specialty. New processes, new materials and new hazards bring new problems of protection, and make further demands on those with responsibilities in this wide social field."

The lazy reviewer's resort is to list chapter headings of a book and term it a review. Without laziness that practice is somewhat invoked to reveal the wide range of coverage brought together by the numerous authors. The first volume embodies the legislative and statistical aspects; the organization and operation of industrial medical and nursing services; the medical aspects of coal mining; shops and offices; inland transport; and sections on the young worker, the disabled worker, and canteen services in industry. The second volume embraces sections on occupational diseases of the skin and eye; occupational psychology; work with compressed air; compressed air illness and its prevention; electrical accidents; explosives; heating and ventilation; lighting, glare and efficiency; intense sound and ultra-sound; effects of ionizing radiations, and protection against ionizing radiations. The third volume is devoted solely to silicosis and other fibrotic pneumoconioses, pneumoconiosis without fibrosis, and toxicology.

Some early portions of this book will strike Americans as vague and inappropriate to conditions in the United States. Such items refer to the factory inspectorate, appointments by the crown, acts of Parliament, British factory acts, the Ministry of Labour, etc. All of that is important for home consumption, and no fault is found with such contents. However, when the authors move over into technical matters, all such have no national boundaries so that the occupational health teams of all countries meet on fairly common ground.

Although the title of the system includes industrial hygiene, actually the British Isles have not discovered the industrial hygienist by that name, as a member of the team. All manner of industrial hygiene is applied, but its application is conducted by factory inspectors, physicians skilled in the field, and engineers who function as engineers and not as industrial hygienists. Apart from governmental workers it has been stated, but not in this book, that only two industrial hygienists function in that name in the British Isles. No matter. This is but an affair of professional semantics.

Some may toy with the idea of buying just one of the three volumes because of restricted interest. Thus the third volume exclusively is devoted to the dusty lung diseases and industrial cancer and toxicology. That volume is good, but buy all three. All are good.

Key Position

OCCUPATIONAL HEALTH NURSING: MARY LOUISE BROWN; JOHN WISTER MEIGS. Springer Publishing Company, Inc., New York, 1956, pp. 276, $4.50.

Always occupational health nursing has needed voices for the adequate presentation of the key position occupied by the nurse in industry. This book is a happy voice, but no voice in the wilderness. There is no wilderness. These authors have dropped the cant and protocol that too often mark the writings about industrial nursing. The purpose of the book is found in the preface:

"Most nurses now in the occupational health field had to accept this responsibility without special preparation because little was known about their functions. During the past decade, occupational health nursing has become a nursing specialty that can be clearly defined. The formulation of ideas and the collection of data, as presented here, grew out of five years of teaching students and graduate nurses and almost 10 years experience as an occupational health nurse.

"It is fortunate that the worker's health becomes increasingly valuable as industrialization spreads. Present patterns of occupational health programs have developed because industry brings people together in groups large enough to warrant providing health services for them. About half the United States work force can be supplied with health services similar to these programs, which means that there is room for 30,000 occupational health nurses."

This book is written for the time, which should not be in any chimerical future, when there will be 30,000 industrial health nurses. Even now there may

be some 18,000. Early in the text the fundamental principles of occupational health nursing are set forth:

"Occupational health nursing services should be provided within the framework of an occupational health program.

"The primary responsibility of the nurse is to help each individual to conserve, promote, and restore his health.

"The nurse should fulfill her role as a member of an occupational health team in accordance with nursing ethics.

"Provisions should be made for periodic evaluations of the nursing service; and for improvement of the service through the sustained professional growth of the nurse.

"Occupational health nursing services should be in conformity with and closely related to community health programs."

All of occupational health nursing is reduced to 10 functions soon to be stated. Every one of these functions is developed in orderly detail, presaged in the 10 terse chapter sections:

1. The occupational health nurse gives nursing care to workers with occupational injuries and diseases.

2. The occupational health nurse gives nursing care to workers with non-occupational injuries and illnesses.

3. The occupational health nurse participates in the health evaluation program.

4. The occupational health nurse counsels workers regarding personal and family health problems.

5. The occupational health nurse compiles individual health records for each employee, and compiles, evaluates and interprets epidemiological and statistical information concerning the health service.

6. The occupational health nurse plans, participates in, and evaluates health and safety education activities.

7. The occupational health nurse advises on environmental sanitation.

8. The occupational health nurse carries on those nursing administration duties that assure the efficient management of the occupational health service.

9. The occupational health nurse works in cooperation and liaison with many professional and non-professional people associated with state and local agencies.

10. The occupational health nurse takes an active part in nursing activities and as a citizen in community activities.

In time the book passes from industrial nursing itself to the total components of the group in which industrial nursing is a part. This includes industrial hygiene, industrial safety, workmen's compensation, labor union relations, special programs such as dental health, hearing conservation, the aged worker, the alcoholic, women workers (not that there is any reason for bracketing the alcoholics and women workers). This book will provoke pride among occupational health members, but here and there will be a little aggrievedness. In many places the authors emphasize "public health procedures and principles" when the appeal would have been greater had the language been "preventive medicine principles" and "preventive medicine procedures." In some sections of the country at least, nothing raises the hackles of the prideful industrial nurse so much as being styled a public health nurse. That goes for industrial physicians as well. Flesh crawls when their services are placed in the category of public health, which to them smacks of officialdom, but they purr endlessly when their services are clothed with the appellation "preventive medicine."

Transient Tissues

COLLOQUIA ON AGEING, Volume 2: AGEING IN TRANSIENT TISSUES: Editors for The Ciba Foundation, G. E. W. WOLSTENHOLME and E. C. P. MILLAR. Little Brown and Company, Boston, 1956, pp. 263, $6.75.

At the University of Michigan in Ann Arbor, the convenient term "discussional" was coined to designate certain of its informal assemblies. The Ciba Foundation in London, in designating some of its discussions did not coin, but utilizes the term, "colloquium." This is the second colloquium on ageing.

This title may be confusing and perhaps even repelling to the uninformed. A few examples of "transient tissues" clear the confusion. Obviously a placenta is a transient tissue. So also are the antler of the deer, the Graafian follicle of the ovary, the red cells of the blood. Manifestly these transient tissues come to a timely end, ageing and eventuating in senescence. If it were possible to grasp in finality the ageing processes in the transient tissues, then in time much more might become known about the ageing of non-transient tissues. And so the purpose of this colloquium. In this conference, but perhaps only as an aside, came the reckoning that ageing in the sense of maturing is a good thing, and that all the bad is associated with senescence. Not all the difficulties of ageing were solved in London, but some were. Yet, for the time being, we are all threatened with that oncoming disturbance, the senescence of wearing out tissues.

An Old Friend

DISEASES OF THE SKIN: 11th Edition; RICHARD L. SUTTON. C. V. Mosby, St. Louis, 1956, pp. 1479, $29.50.

This book is an old friend. It occupies an honored place on the shelves or desk of many an industrial physician. It is his leaning post for guidance in dermatology. No elaborate portion of this comprehensive test is segregated as "industrial dermatology" although extensive coverage is provided. Often the industrial physician is more concerned in skin conditions of non-occupational origin that simulate those attributable to industrial exposures. The trade dermatoses the industrial physician is likely to know. The non-occupational ones call for a conference with this text together with its profuse and revealing illustrations.

This is no review. Merely it is an announcement that the eleventh edition is ready to join the ranks of the industrial physician's sturdy references.

INDUSTRIAL MEDICINE AND SURGERY

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Absenteeism From Evasion of Adulthood

THE RESEARCH COUNCIL for Economic Security estimates the aggregate cost of absenteeism to Industry, and indirectly to the consuming public, to be in the startling bracket of 180 million dollars per year. If the estimate submitted is correct, there is a direct challenge to medicine, management and labor for proper solution.

A substantial portion of absenteeism is created by individuals who continually evade adult responsibility—the workers with child minds in adult bodies who face everyday problems with reverted childhood excuses for failure to measure up to adult responsibilities. They are the drone bees of society. These drones were seen in frightening numbers in the army. The same soldier that came under the title of army goldbrick frequently is the same civilian who fell into unsatisfactory employment status. Review of numerous articles on absenteeism reveals that primarily the same drone bee worker in industry, showing unquestionable and indisputable evidence of fundamental evasion of growth, is directly responsible for the high percentage of absenteeism. There are exceptions, of course, and such a review does not include the justifiable concrete evidence of objective physical reasons for work absences such as hernia repair, fractured extremities, or even monthly complaints of dysmenorrhea which may be caused by endometriosis. True, many women use this as a heaven-sent excuse for probably an unrecognized subconscious maladjustment either at home or at work—there is no denying that it achieves results.

Many "drones" are individuals with normal I.Q.'s but who have a perpetual hatred for society in general; others, with normal mental faculties, are handling jobs of the square peg and round hole variety or are emotionally inadequate through frustrations at home or with fellow workers; while others have a chronic physical condition plus a secondary emotional imbalance.

The frustrated worker with a boss who is short tempered, one who never praises work well done, has only one recourse—occasional relief by absenteeism caused by out-and-out retaliation or by subconscious manifestation under the unrecognized disguise of a "splitting headache," etc. This is not a particularly new concept but is unfortunately the cause of all too much absenteeism.

Another large group are those who feel they are not paid enough, or are "too good for the job," or "the company couldn't do without them." This group probably accounted for many of the army misfits.

At the other extreme is the employee whose wife and unmarried family members earn a substantial income. Often such an individual will "knock off" a day every now and then for a fishing expedition. This same individual, in the midst of pseudo-sickness states, causes an insurance company difficulty in finding a proper compensation settlement intended not for spurious allegations as to sickness but only genuine ones.

Absenteeism breeds absenteeism. All any well functioning industrial department has to have is one chronic offender whose work has to be divided among his fellow workers and the trouble begins. They are quick to observe the offending co-worker flitting about town on his self selected extra days off. This quickly breeds dissatisfaction. Before long absenteeism is rampant in the department. This type of absenteeism is comparable to one rotten apple spoiling a barrel of good apples.

Careful charting shows a regular curve of Monday or Friday offenders—the holiday en-

thusiasts who always feel that the company owes them an extra day or so.

"Absenteeism is here to stay" in this imperfect world of ours which is afflicted with too high a percentage of child-thinking in adult jobs.

—N. GILLMOR LONG, M.D., Chief Surgeon,
Lumbermens Mutual Casualty Company.

The Rise of Industrial Hygiene

SOME FINE day, and soon, industrial hygiene in all its astonishing professional significance is going to be discovered. The industrial hygienists have been so busy becoming a sturdy profession that they themselves have not quickened in realization of the full role they well-nigh have perfected.

About 30 years ago there were a handful of agile minded young men serving as assistants to industrial physicians in industrial hygiene. They were little trained, little guided and little equipped with instruments. Today there are more than a thousand industrial hygienists standing apart in their own organization, but not apart as a member of the total occupational health team. The majority are well qualified and experienced and served by a myriad of procedures and devices about which there were not even dreams 30 years ago.

The American Industrial Hygiene Association in its appeal for recruits for fascinating careers in justification uses this language:

"With the growth of modern industry, a bewildering array of new materials and processes have been developed to assist in the production of improved products in ever increasing quantities. Many of these new developments bring with them hazards which are potential dangers to the health of workers. Invariably, however, when proper control is applied, these hazards can be checked. This has become the job of a relatively new profession. . . . Industrial Hygiene.

"The young group of trained practitioners in the field of Industrial Hygiene has already set an enviable record for health maintenance in companies throughout the nation. But, as industry continues to grow and become more complex, the list of problems with which the industrial hygienist is faced increases in number and complexity. If industrial hygiene is going to keep ahead of these problems, reinforcement is needed."

Even so this enthusiastic language so characteristic of a youthful profession has not applied colors of sufficiently high illumination. In 30 years industrial hygiene has come to touch, without exception, all industry—from the top down to the hole-in-the-wall cigar store. If that last statement be challenged, let doubt be dispelled at once through the statement that the individual cigar wrapped protectively in cellophane derives from the totality of industrial hygienic effort that demands the hygienic and sanitary best in all of industry's work places and products.

It does not follow that all industry now is served directly. That time may never come, nor is it certainly desirable. What is more important already has been achieved—the influence toward industrial hygienic betterment in all of industry. Unlike the maddened Semmelweis shouting his benevolent truths on street corners, these youthful industrial hygienists happily are poor preachers and pronouncers. Instead, they are characterized to a striking degree by action, performance, demonstration, and creativeness. No sensible person at this time would seek a career as a buggy manufacturer; nor would he expect a fortune as a grower of woad. Those are dead or dying occupations. There is nothing dead or dying about the industrial hygienist. May their kind increase!

Fundamental

OF ALL THE essentials for the establishment of an advancing human society, the right to private property, as a moral concept, seems fundamental. Socialism means: "A state or a system in which there is no private property." Yet advocates of socialism claim for it the virtue of its being a system of society advanced beyond that of liberalism and rights to private property. How could socialism be an advanced form, when it embraces a concept that would have precluded the advancement of civilization? The only advancement to be claimed for socialism is its advancement in the sense of time because, due to its inability to generate any accumulation of the tools required for an advanced society, it must subsist on the confiscation of what has already been produced under some other plan; it has to parasitize something. The confiscation of private property is civilization in retreat.

—From "Liberty, A Path to its Recovery," by F. A. HARPER, New York, Foundation for Economic Education, 1949, p. 34; in *Northwest Medicine*, August, 1956.

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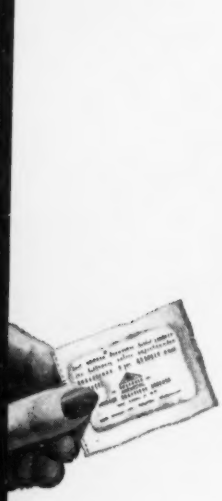

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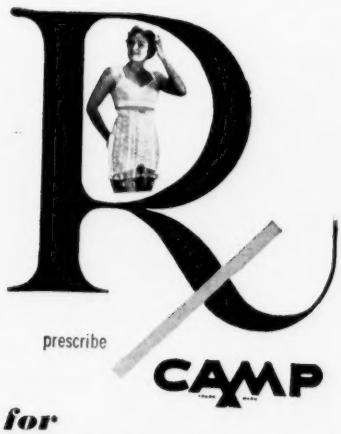

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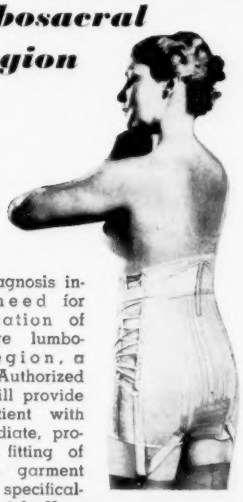

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News, Comment, Opinion

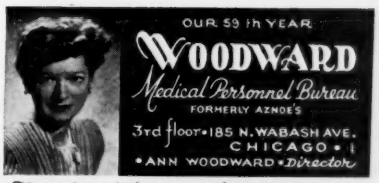
SCIENCE is a first-rate piece of furniture for a man's upper chamber, if he has common sense on the ground floor.
—Oliver Wendell Holmes

Vitamin-a-Day

YELLOW DISPENSERS in the cafeterias of the Motorola Company will dispense free vitamin pills to all workers from November 1 through April 1. Although Motorolans are requested to take only one tablet daily, company nurses will give the worker additional pills, if a written request is brought from the doctor. The Company informed its employees that this year's vitamin tablets are usually only distributed to hospitals — not sold by drug stores. Flu shots will also be administered to workers during first week in November by registered nurses. Employees allergic to eggs, however, are advised not to take the shot, because after effect will be same as when eating eggs.
—From *Industrial Relation News*, October 27, 1956.

Over 40—Take Care

THE HEALTH Research Center, Chicago, in a sampling of 500 business executives, discovered that more than half had physical ailments of which they were unaware. A few under 40 years of age had no organic faults, but the implication was that everybody over 40 — whether executive or subordinate employee — may have something wrong with his internal mechanism, but is too busy or indifferent to find out. No doubt if every adult of even 30 and over, of whatever vocation or status, were to be given a thorough physical check-up, somewhat similar result percentages would be disclosed. There probably would be 10% who have a faulty heart condition; 2% would have cancer — which should be a shocking revelation in itself; 11% would have insufficient thyroid gland secretion; about 11% also would have an excess in fatty elements in the blood, a factor in hardening of the arteries; some peptic ulcers also would be brought to light, while such things as kidney ailments and tuberculosis might be found in persons who now claim to be in reasonably good health. No doubt any searching study of any large group of average citizens also



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POSITIONS WANTED

Medical Director (a) Long associated, indus med field; past 5 yrs, med dir, lge size regional plant of leading co; taking Boards. Preventive med in indus.

Psychiatrist (b) Dipl; Psy & Neurology; qual, psychoanalysis; well qual, organize, direct progressive indus prog in human relations or mental health; 8 yrs very successful practice.

Medical Director (c) MD, St. Louis Univ; 3 yrs, res, surg & ortho; 2 yrs, asst med dir, major co; 2 yrs med dir, leading co., automobile, accessories; seeks greater responsibilities; indus career oppty; early 30's; any locality.

Medical Director (d) Currently med dir and consultant of lge co., also Lecturer at univ level; wishes to take full charge of large installation, industrial hygiene; seeks New England location.

Medical Director (e) 3 yrs, asst chief surg; USAMC; 6 yrs, successful priv pract; 2 yrs Dir P.H., 2 yrs dir med services, foreign govt; inter indus med with med case prog; any locality.

Medical Director (f) Fellow, Indus Med Assn; Previous work, Surg and Toxicology; presently staff phy of leading co; now seeks med dir or asst med dir; will locate in Ohio.

Industrial Physician (g) MD, Cornell; 3 yrs, mixed res; 2 yrs, Med Ofc, USNMC; yrs res phy med; 1 yr, gen prac; 5 yrs, asst med dir, Life insur co; prefers indus, adm & cl duties.

Surgeon (h) 2 yrs, Med ofc, USAMC; 3 yrs priv genl prac; 4 yrs res, surg & ortho; prefers industry.

Staff (i) MD, Cincinnati; 2 yrs, ward ofc, station Hosp, USAMC; foreign theatre; 3 yrs priv pract includ year, dermatology; 4 yrs, staff phy, largely toxicology, major chemical co; prefers South, SW, Calif.

Staff (j) Working toward Cert, Prev. Med; seeks position in Indus, Atomic or Aviation Med; now is Phy-in-chge, leading co, also Instructor, Post-Grad level, prefers So or W.

Staff (k) 3 yrs, priv pract; prefers indus, Public Health or Traumatic Surg; West or North West locality; early 30's.

Staff (l) Seeks position Indus Med, including minor surg; resident, Path; served as Med ofc U.S. Navy, 2 yrs; wants perm sal; prefers location that is cool in summer; early 30's.

General Surgeon (m) seeks indus surgery, foreign post; graduated, Johns Hopkins; excel residencies; P.G. cardiovascular research, Johns Hopkins & Yale; 2 yrs, surgeon, USAMC; age 29.

Staff (n) 30; M.D., Harvard; Board elig internist; past year, priv pract; prefers indus med in which specialty he seeks career.

Staff (o) Seeks indus med as career; any large city; 2 yrs, medical officer; 3 yrs, priv medical & surgical pract; early 30's class "A" graduate; N.Y. or N.J.

POSITIONS OPEN

Medical Director (a) To organize Preventive Med prog; heavy indus; 12,000 empl; completely new, well equip'd med dept; 5 part time physicians; $14,000 plus exc bonus; lge corporation, many plants; oppor advance; E.
Medical Director (b) To hd med dept of leading cannery; staff of 7 RN's, phy therapist; 4000 empl; shld have advanced trng, indus med; or GP w/sev yrs exper beyond trng; to $15,000; MW.

would disclose that a substantial percentage are now working under conditions of overstrain and over-worry, or in unpleasant environments, or perhaps needlessly over-taxing their nervous systems — and thereby laying themselves wide open to serious ailments in a very few years. Members of the medical profession, hospitals, clinics, public health agencies, and a score or two of medical or semi-medical societies disseminating educational information about special ailments, would seem to be ample to permit any person at all concerned about his health to learn his true condition. Yet numerous persons who have their cars gone over often give them more solicitude than they grant to their own bodies — they may wonder why around 50 or so they are worn out. This is a field where ignorance is not bliss, and in these times of available assistance seems rather foolish.

—From *Blackfoot* (Idaho) *Bulletin*, October 2, 1956.

Cost of a Job

THE STEEL strike last July, and others that are with us from time to time, remind us that a job is far more than doing a specific amount of work and getting a certain sum in the pay envelope. Each job represents a major capital investment. Someone had to make the investment before the job could exist. Benjamin F. Fairless, for many years Chief Executive Officer of United States Steel, estimates it takes about $12,000 of capital on the average to create a job for one man. In 1954 American industry spent about $28 billion on new plants and facilities. It maintained and provided employment for 2,300,000 people. Where would the government get the $28 billion to provide this number of jobs? "There is a belief," Mr. Fairless said, "This could be done simply by soaking the rich some more. The answer, utterly incredible as it may seem, is: that if the Federal Government were to take from every taxpayer in this country every penny of his taxable income above $2,000 a year, it still wouldn't get the $28 billion."

—From *Medical Times*, August, 1956.

Healthy City

LOUISVILLE is becoming the nation's third city with a community-wide occupational health program. Thousands of health problems among employees have been turned up in the two pioneer cities — Birmingham and Atlanta — by their occupational health programs. Birmingham's industrial plan is nine years old. The Occupational Health Institute of Kentucky, a private, non-profit institute, organized in 1955 with the aid of the Associated Industries of Kentucky, has signed up a dozen Louisville industries for its service. The Birmingham and Atlanta industrial health plans rely heavily on "Healthmobiles," and the Kentucky unit expects to have its own Healthmobiles by December. Of the first 6,200 persons tested, 59% had health problems; 312 had high blood pressure; 3,164 had visual problems; 1,554 were overweight; 322 had chest problems including tuberculosis; 358 had anemia; and 76 had abnormal blood sugar with the possibility of diabetes. Although employers normally bear the cost of the service, some of the employee groups in Atlanta pay for the services themselves. The tests are not complete physical examinations, and do not provide diagnosis or treatment. An em-

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ployee with a health problem is advised to see his own physician. Records are confidential except when tests indicate a condition dangerous to other persons. Employers can cut by 20 or 30% their costs of absenteeism, personnel turnover, accidents, insurance, company health programs, and low morale and efficiency.

—From *Louisville Courier-Journal*, October 11, 1956.

Back to the Farm

MEDICAL STUDENTS, a survey shows, are more likely to have recurring headaches than any other occupational group. Farmers are the least susceptible. This was reported by a Louisiana doctor in describing one of the most extensive surveys ever made of the causes and distribution of one of mankind's most prevalent disorders. The study showed that "over 60% of the general population have headaches." And the survey, involving nearly 5,000 persons, showed also that your chances of having recurring headaches are strongest if you are (1) a woman; (2) under 20 years of age; (3) unmarried. People who are divorced or separated from their spouses are more likely to have them than happily married folks. People with no education at all are least likely to be sufferers among groups having varying degrees of education. Dr. Henry Ogden of Louisiana State University School of Medicine gave results of the study in a scientific exhibit at the opening of the 50th Anniversary Meeting of the Southern Medical Association, second largest medical organization in the country. Dr. Ogden said 80% of the freshman and senior medical school students questioned were headache victims, topping even business executives, of whom 77% are sufferers. In subsequent order on the list were professional people, 70%; housewives, 69%; clerks, 68%; salesmen, 58%; manual laborers, 55%; and farmers, 50%. Other findings were that 78% of persons under 20 years of age have headaches, but only about 28% of those over 60 are troubled; 71% of all females are sufferers, compared with about 50% of males. Unmarried persons topped the list in a marital status comparison, with 70.8% having headaches, closely followed by separated, 70.5%, and divorced, 68.5%. The percentage for married persons was 61.1%, while the widowed category was lowest — 52.3%. Dr. Ogden said all headaches are characterized by some kind of disturbance of the blood vessels. Predisposing factors include sex tension, glandular disturbances, heredity, high blood pressure, allergies, stress, and injuries of the upper spine. "Trigger factors" include fatigue, hunger, sex tension, allergic reactions, acute nasal trouble, and excessive smoking.

—From *Chicago Tribune*, November 13, 1956.

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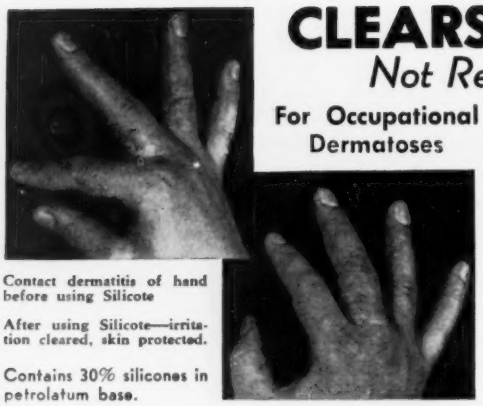
HALIMIDE and your INSTRUMENTS...THEY COMPLIMENT EACH OTHER

Man of Vision

LT. COL. JOHN W. SHERIDAN, Vision Consultant, Army Environmental Health Laboratory, Office of the Surgeon General, after spending a week investigating the occupational vision program in operation at Blue Grass Ordnance Depot, states that "it is one of the best and most effective of some 80 Army programs visited throughout the United States. Since the beginning of the program late in 1954, all the employees of the depot have had their vision tested by medical personnel at the depot dispensary. Better described as



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Contains 30% silicones in petrolatum base.

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1. Talbot, J.R. et al: J. Inv. Derm. 17:125
2. Morrow, Grant: Calif. Med. 80:21

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visual screening, these tests are made using a mass vision testing instrument which measures the visual skills of the employee and helps the medical people at the installation to determine which employees should be advised to consult their local eye doctor. Over 244 employees have been referred for professional eye examination during a period of approximately two years. One of the most important features of the program is carried out and administered by safety personnel at the depot. The safety director and the safety inspector determine the type of eye protection necessary in the various operations in the working areas. Not one disabling eye injury has been sustained at the installation since the initiation of the program. The depot provides both plano and prescription safety glasses to workers in many jobs where eye protection is deemed to be necessary. These glasses are purchased by the depot and issued cost-free to those employees.

—From *Richmond* (Kentucky) *Register*, November 3, 1956.

All They Can Do?

NOISE is the chief problem of Utah's biggest employer, Hill Air Force Base. The jets make so much noise on takeoff that the neighbors complain. The base is building sound baffles to diffuse and dissipate takeoff roar, but, as Hill's top brass are the first to admit, noise is a part of the jet age and is probably here to stay. All they can do is plead for the public's patience, forebearance and understanding.

—From Ted Cannon's "Scene Today," in *Salt Lake City Desert News and Telegram*.

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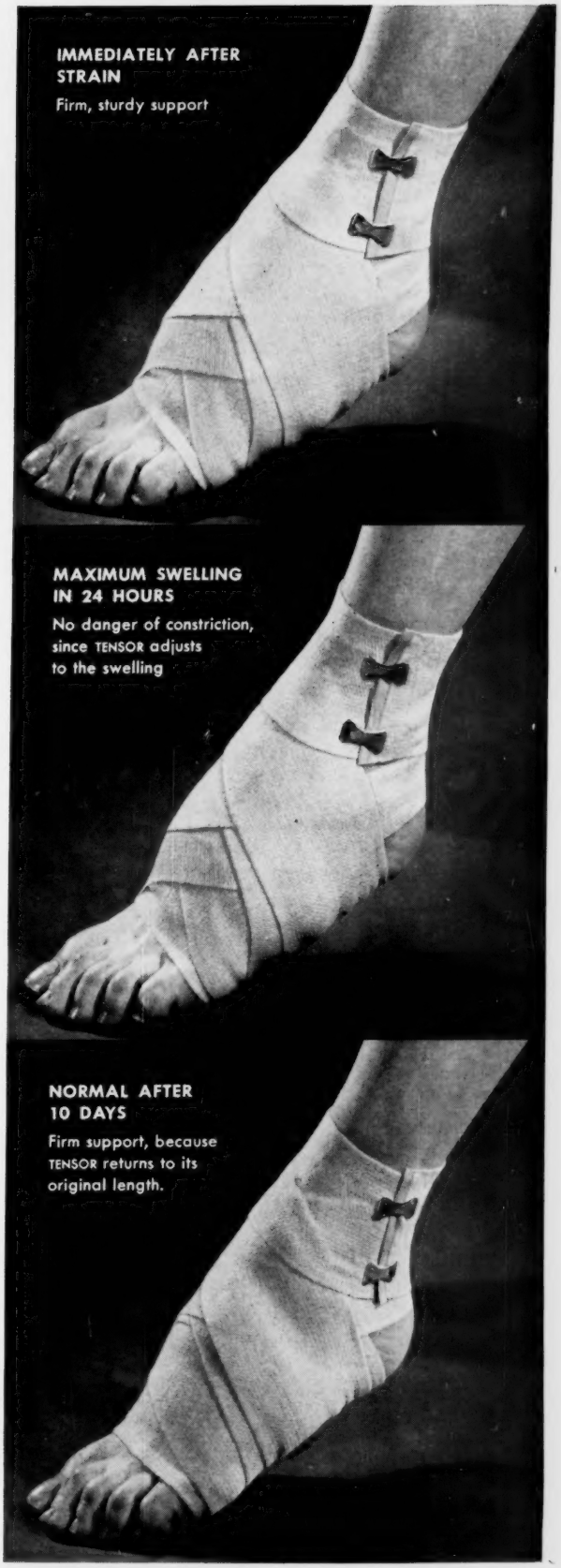
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Firm, sturdy support
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*Trapnell, J. M., Jr., and Linder, E. K.: The Electrocardiogram in Industry, Indust. Med. & Surg. 24:335 (Aug.) 1955

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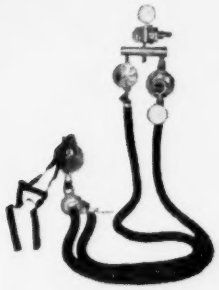

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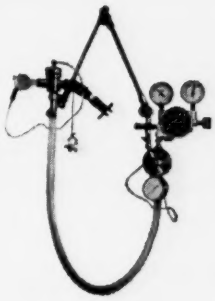

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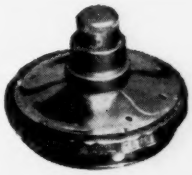

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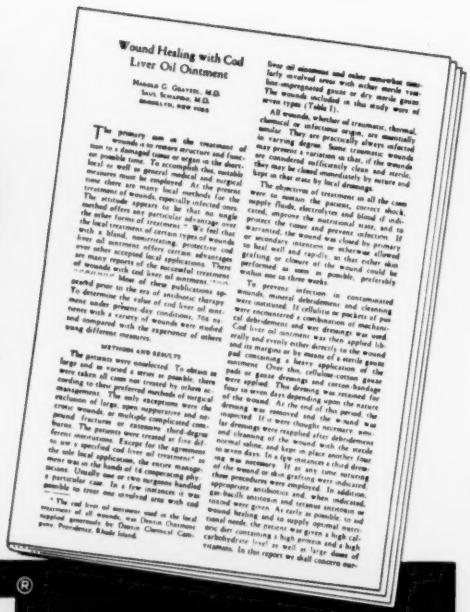
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1. Grayzel, H. G., and Schapiro, S.: Western J. Surgery, Obstet. & Gyn., Oct. 1956.

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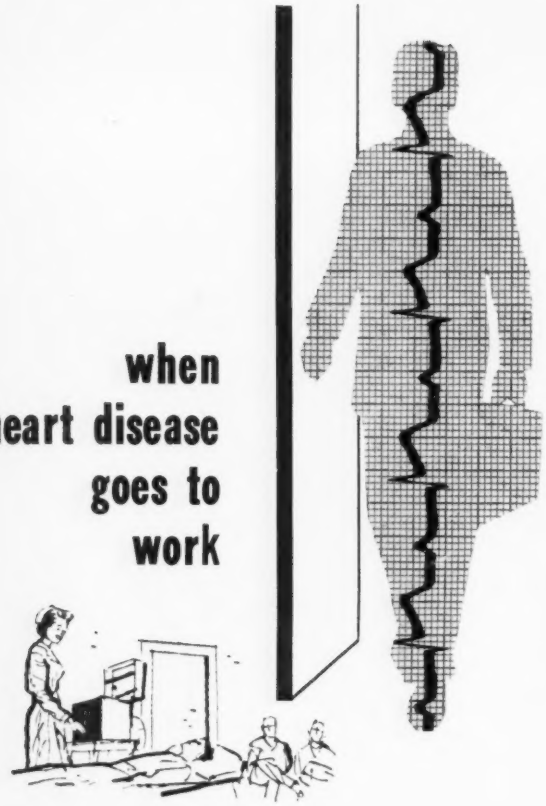

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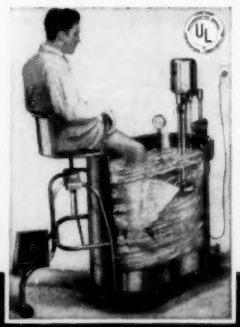

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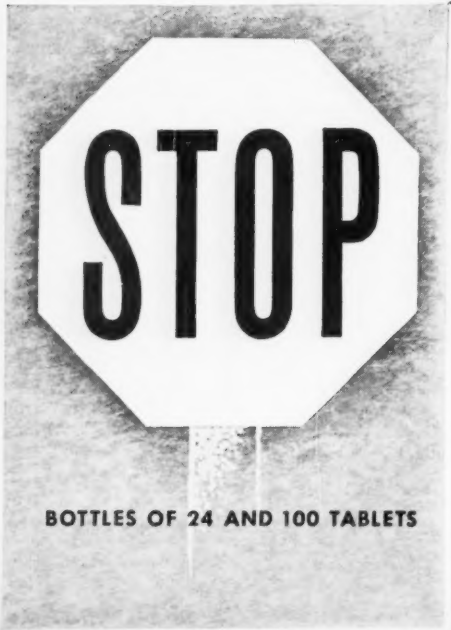

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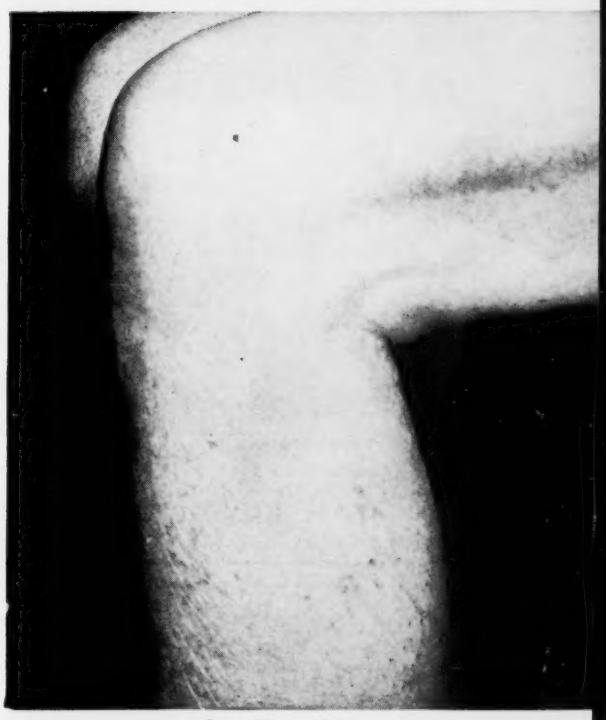

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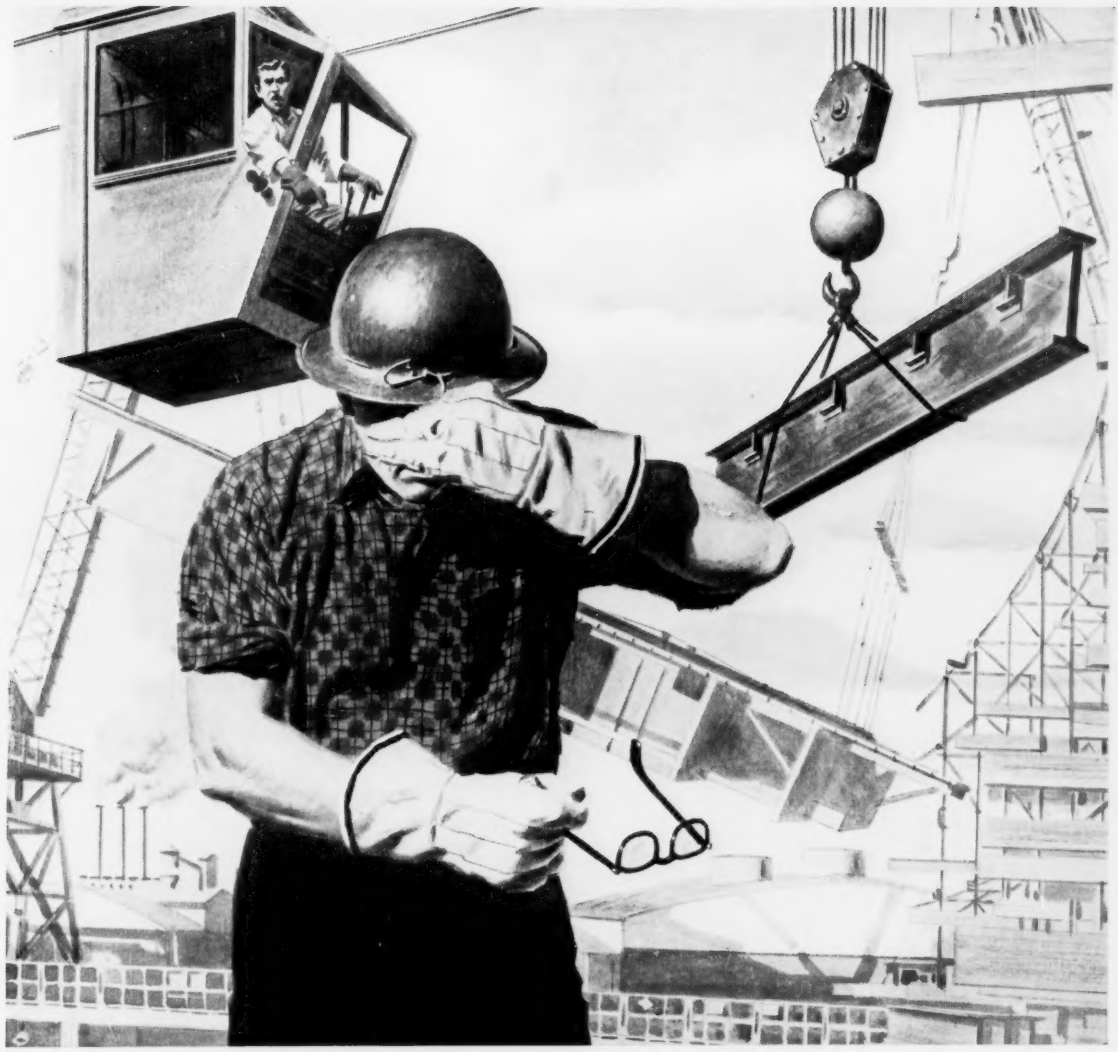

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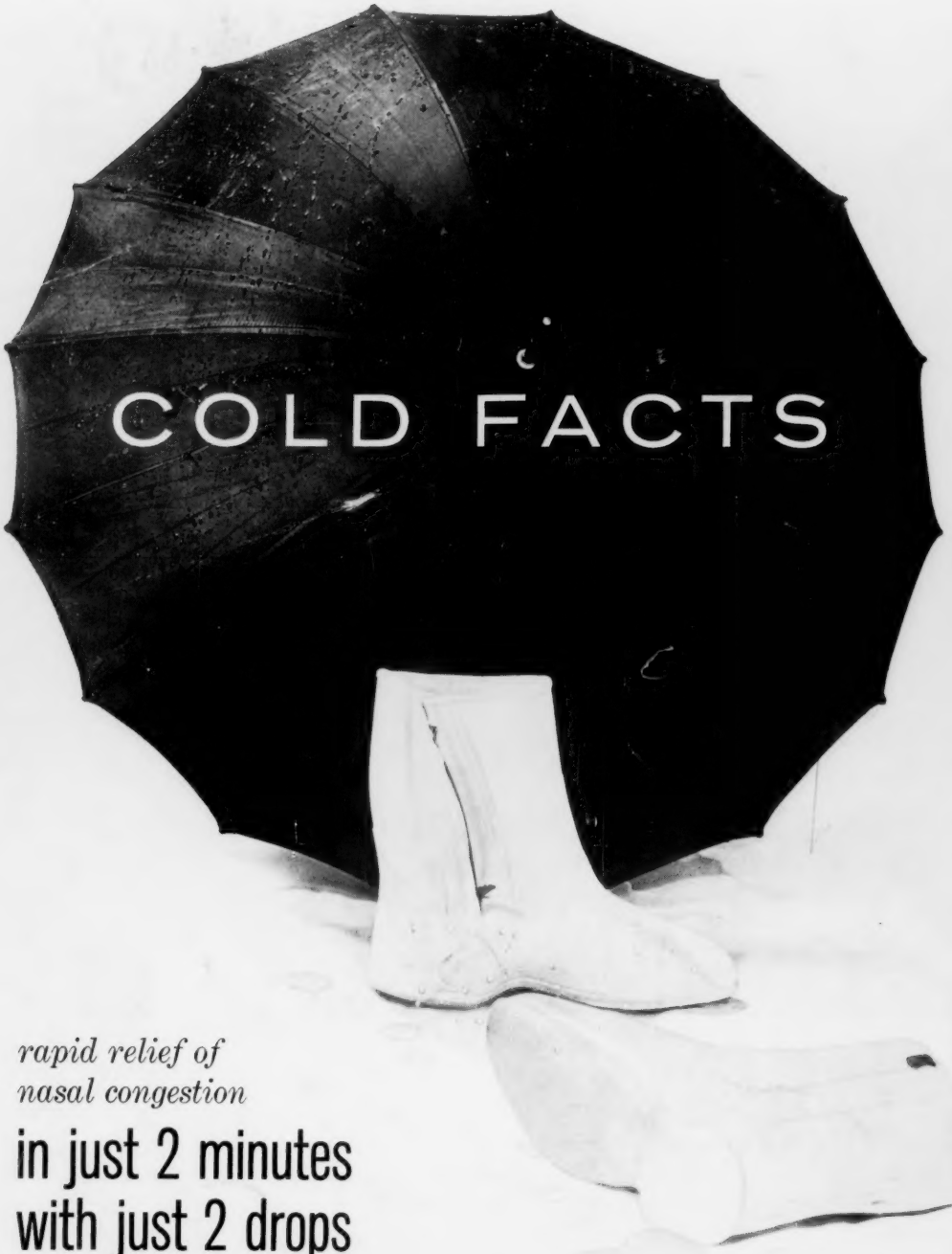

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